THE MONTHLY

Review

Official Organ of the American Electroplaters' Society
A Society for the Advancement of the Science of Electroplating

MAY ✦ ✦ ✦ 1945

WHAT A WONDERFUL OPPORTUNITY TO CUT COSTS AND INCREASE PRODUCTION WITH THIS CLEPOLON PROCESS!

CLEPOLON DEBURRING PROCESS is saving many million Man-hours on War Products and will greatly reduce manufacturing costs of Peacetime Products.

CLEPOLON
DEBURRING PROCESS

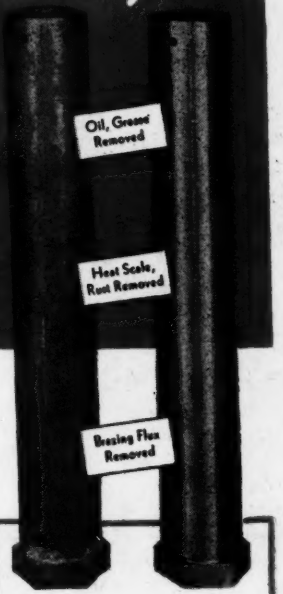
Replaces Hand Filing and Hand Grinding.
Eliminates additional finishing operations ordinarily used to remove filing marks.
Clepolon Process leaves surface evenly smooth with a radius on edge if required.

FREDERICK **GUMM** *Chemical Company Inc.*

538 FOREST STREET, KEARNY, N. J.

Oakite Cleaning

Speeds Surface Preparation of INCENDIARY BOMBS by Quickly Removing Oil . . . Rust . . . Heat Scale, Brazing Fluxes at LOW COST!



BEFORE AFTER

Photo shows type of steel incendiary bomb before and after surface preparation with Oakite materials.

OIL . . . GREASE . . . HEAT SCALE . . . RUST . . . BRAZING FLUX REMOVED

CONTINUED use by contractors making steel incendiary bomb cases and bomb components clearly indicates that Oakite cleaning materials and techniques have been an important factor in expediting the production of these weapons.

For the removal of oil, grease, shop dirt . . . heat scale and discoloration . . . rust, or brazing fluxes resulting from different operations, FAST-WORKING Oakite materials effectively prepare surfaces of bomb casings and components for organic, electro-plated or other rustproofing finishes . . . to help contractors more easily meet schedules!

Put Oakite Service to Work in Your Plant!

Want SPEED . . . LOW-UNIT COST . . . BETTER RESULTS in cleaning operations? Having difficulty with SURFACE PREPARATION of war work items? Then—take advantage of successful Oakite experience NOW! WRITE US all about your problem . . . our engineering and technical service facilities are *yours*—without cost or obligation!

OAKITE PRODUCTS, INC., 40 Thames St., NEW YORK 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE MATERIALS...METHODS...SERVICE — Buy Bonds for Victory — **CLEANING** FOR EVERY CLEANING REQUIREMENT

Enthone
PRESENTS 4 LEADING
Metal Finishing Products

That's why the graphic story of Luster-on, told in these unretouched photographs of a bit brace chuck means so much to manufacturers of tools or other zinc-plated items.

Luster-on is an easily-applied, chemical bright dip which gives zinc the stable, passive corrosion-resistance of cadmium — protecting parts from unsightly finger-marking and age stains. Yet Luster-on is available now for your products.

The above photos show clearly how successfully Luster-on treats both knurled and smooth surfaces — gives them mirror-like brilliance, and long-lasting tarnish resistance. Investigate Luster-on, the economical protective finish.

3

KEMO SAYS: Send us a sample of your zinc or zinc-plated items for free processing with Luster-on. See for yourself how it can improve your products.

THE *Chemical* CORPORATION
93 Broad St., Springfield 5, Mass.

THE CHEMICAL CORPORATION
93 Broad St., Springfield 5, Mass.

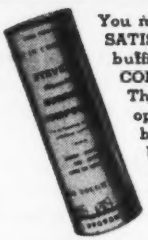
Please send me full particulars about Luster-on bright dip for zinc surfaces. I am (am not) sending sample part for free dip. No obligation, of course.

Name.....

Address.....

Performance SPEAKS THE FINAL WORD IN TIMES LIKE THESE!

There's a Big Thrill - Seeing a **GOOD FINISH**



You may not get a "thrill," but you will get a *whale* of a lot of SATISFACTION in seeing the GOOD FINISH you get with your buffing and deburring operations if you use a STEVENS COMPOSITION.

There's a STEVENS COMPOSITION for every metal—every operation . . . on polishing wheels, Tampico brushes or buffs . . . for hand operations or automatic machines.

Use a STEVENS COMPOSITION on your next job . . . see for yourself what a difference they make in the finish. Then "join the army" of satisfied users of STEVENS COMPOSITIONS.

STEVENS TRIPOLI COMPOSITION

FREDERIC B. **STEVENS** INCORPORATED

DETROIT·26·MICHIGAN

- NEW ENGLAND — 186-192 Brewery St., New Haven, Conn.
- NEW YORK and PENNSYLVANIA, 93 State St., Buffalo, N. Y.
- INDIANA — Hoosier Supply Co., 36 Shelby St., Indianapolis, Ind.
- CANADA — FREDERIC B. STEVENS OF CANADA, LIMITED
  - 1262 McDougall St., Windsor, Ontario
  - 2386 Dundas St., West, Toronto, Ontario

THE MONTHLY

Review

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JACK BAIN
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CONTENTS

HAYFORD & ROGERS—Brass Plating for Rubber Adhesion 451
WAITE—Bright Nickel Plating 467
GLASSTONE—Part XIX 471
GRAHAM—A.E.S. Research 474

DEPARTMENTS

Membership Report 497
Abstract Section 503
Book Review 504
Industry News 507
Amendments ..... 511 & 515
Branch News 518
Branch Directory 537
Advertisers Index 539

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Entered as second class matter January 21, 1943, at the post office at New York, N. Y., under the Act of August 24, 1912.

UNICHROME*

COATING 202

Gives Extra Protection in Strong Plating Baths

With Unichrome Coating 202 on your racks, even the toughest solution won't get to first base. Especially durable when force dried, it sticks to plating racks and fixtures *longer*—resisting even severe anodizing baths and strongly alkaline solutions. What's the reason? It's formulated of special resins that have shown maximum chemical resistance under actual shop conditions.

And although these resins are in great demand for other war uses today, there's been no change whatever in our formula. So start using this current-saving insulation now. Write for prices or a trial order.

* Reg. U. S. Pat. Off.

PROPERTIES

Chemical Resistance—Excellent for all plating cycles.

Toughness—Withstands repeated flexing and shop handling—cuts cleanly and easily at contacts.

Drying—Dipped at room temperature in container in which it is shipped—force dried at 200°F. for extra protection.

Adherence—Excellent for severe cycles. For moderate cycles "Air Dry" Coating is recommended.

UNITED CHROMIUM, INCORPORATED

51 East 42nd St., New York 17, N. Y. • 2751 E. Jefferson Ave., Detroit 7, Mich. • Waterbury 90, Conn.

TRY THESE OTHER UNICHROME MATERIALS

Unichrome "Air Dry" Rack Coating—a rack insulation that can be dipped and dried at room temperature, for use in all plating solutions

Unichrome Quick Dry Stop-Off 322—for cyanide copper and other plating work requiring an extremely adherent stop-off.

Unichrome Quick Dry Stop-Off 323—for chromium and other plating work requiring a stop-off that can be peeled off after use.

Unichrome Resist—a solid insulating material for constructing composite racks, stop-off shields, insulating gaskets, etc.

ANODIZING RACKS BY NANKERVIS

George H. Nankervis Co., 5408 Commonwealth Ave., Detroit, Michigan, designs and manufactures racks and fixtures for every type of anodizing and electro plating service.

The rack shown is one of a complete line of production anodizing fixtures designed to handle every shape and type of part. It pays to use "Nankervis" racks —expertly designed and made, yet costing no more than ordinary racks. Another point: Nankervis specifies and uses BUNATOL for rack insulation; No. 160 for anodizing racks and No. 720 for all other types. BUNATOL rack insulation has, for nine years, been the outstanding insulation in hundreds of shops.

NELSON J. QUINN COMPANY
TOLEDO 7, OHIO

BUNATOL

ANOTHER ENGINEERING TRIUMPH

Cleaning and lacquering this 81-millimeter trench mortar shell were delicate operations. In its making, the shell had to be cleaned between each draw. Then, between final rinse and lacquering, *no rust could be allowed to form.*

"How are these jobs to be done?" makers of the shells wondered. Oil couldn't be used to prevent rust—lacquering can't be done over oil. Specifications did not permit a "phosphatizing" operation.

Wyandotte Chemicals Corporation gave the answer with two of its specialized products—a cleaner and a rust preventive. The shells were treated right after the last draw with a special Wyandotte rust preventive. Merely as an experiment, a shell was let stand 30 days, without lacquering. At the end of that time there was not a speck of rust on the metal!

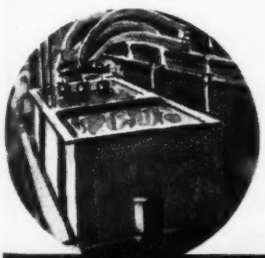
This Wyandotte rust preventive is a powder. It leaves no film on the surface of the metal but literally passivates the steel, thus effectively preventing rust.

Whatever *your* metal cleaning need may be, you are almost sure to find a Wyandotte Product to meet it. Ask the Wyandotte Representative for advice.

Wyandotte
REG. U. S. PAT. OFF.

WYANDOTTE CHEMICALS CORPORATION
J. B. Ford Division • Wyandotte, Michigan
SERVICE REPRESENTATIVES IN 88 CITIES

Given his choice . . . a control or fireball pitcher . . . the manager's selection will normally be control, for he knows what he can depend upon . . . . The "Lo-Hi" pH Process of chemically cleaning ferrous and non-ferrous metals preparatory to plating, makes practical a control in the plating room that gives management the know-what-to-plan-on the rest of the way in production. A comparatively small appropriation for this department (the bottle neck of most plants) will pay handsome dividends all the way down the line. . . The findings of our laboratories and our experience in solving this problem for many manufacturers, is at your disposal.



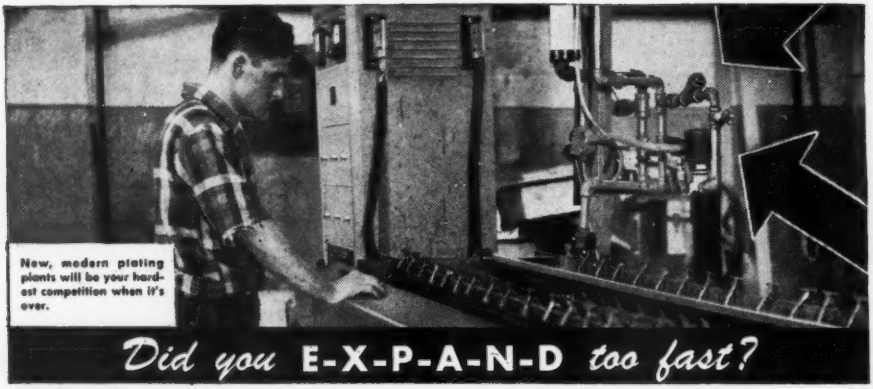
LO HI

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

'32

pioneers in pH cleaning control—serving you since



Did you E-X-P-A-N-D *too fast?*

The contribution of the plating industry to the war effort will never be completely told. Production was doubled and trebled overnight—without time to engineer the job for efficiency, and with many needed accessories not available.

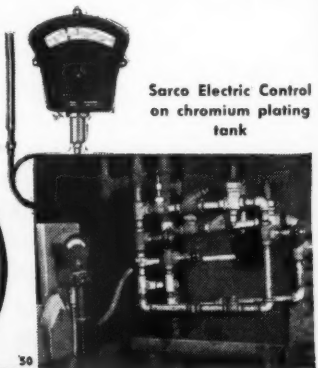
When it is over, only the more efficient plating plants will survive. Faster plating, more automatic, more exacting tolerances and lower costs will be demanded—and obtained.

These strong statements are based on what we know has been done with Sarco in the past few years. From hot water storage tanks to simple wash tanks, and exacting chrome plating to anodyzing, there is a Sarco temperature control that is inexpensive, easy to install and simple to adjust and operate.

You can speed up production, eliminate rejects and reduce fuel costs by the addition of Sarco equipment to your present installation. The Sarco representative will study your plant — make recommendations—save you time and money without obligation.

Sarco TR 21 Control on hot water storage tank

Sarco No. 87 Control on caustic tank



Sarco Electric Control on chromium plating tank

SARCO COMPANY, INC.
475 FIFTH AVENUE
NEW YORK 17, N. Y.
Represented in Principal Cities

SARCO Saves Steam

SARCO CANADA, LTD., 82 Richmond Street, West, TORONTO, ONTARIO

Our Picture

No genealogist was ever more proud of his sterling ancestors than NANKERVIS is of its background.

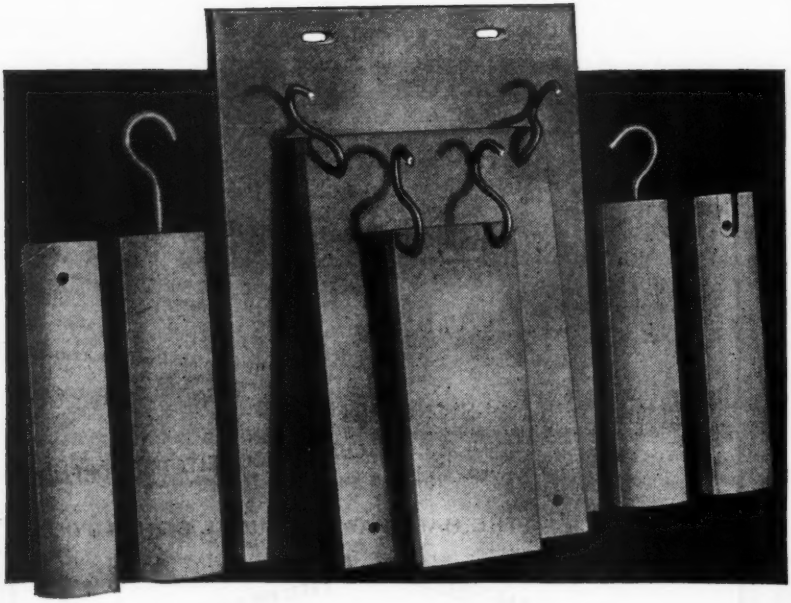
The NANKERVIS policy of representing only those manufacturers where integrity and products "measure up" to its own high standard, plus the experience and ability to completely engineer and install your metal finishing requirements, puts The Nankervis Company definitely "in the picture" of your future plans.

Your inquiry will receive the prompt attention of engineers who understand your requirements.

GEORGE L. *Nankervis* COMPANY

5408 COMMONWEALTH AVE. • DETROIT 8, MICHIGAN

COMPLETE METAL FINISHING EQUIPMENT



Enjoy all these advantages with

Anaconda Copper Anodes

Anaconda Copper Anodes—whether Sheet, Oval, or Electro-deposited—contain less than 0.01 percent of total metallic impurities. This unexcelled high degree of purity pays you with the following advantages:

1. Copper goes into solution faster and more uniformly.
2. The highest quality deposit is produced in the shortest possible time.
3. Slime is reduced to an absolute minimum.
4. Spotting and discoloration of the deposit are eliminated.
5. Scrap losses are exceptionally low.

American Brass produces a complete line of Copper, Brass, and Bronze Anodes . . . rolled Sheet or Oval . . . cut to your own specifications or standard sizes . . . drilled or undrilled . . . with or without hooks—also Electro-deposited Anodes.

Our entire output of Copper is now devoted to the war effort, and Anaconda Anodes are available on a high preference rating. For present or future reference, write for Publication C-5. 43159A

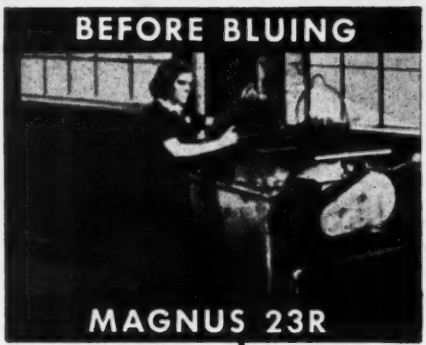
ANACONDA

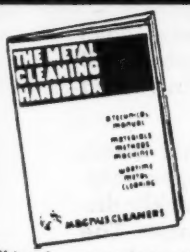
THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Conn. • *Subsidiary of Anaconda Copper Mining Company.* In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

CLEAN METALS

Faster, Better and at Lower Cost!





Write for your copy of the Magnus Metal Cleaning Handbook—the complete manual on metal cleaning methods, materials and machines. When you've read it, then ask us to recommend the method and the cleaner best adapted to your work.

Use the RIGHT Magnus Cleaner in the Magnus Aja-Dip Cleaning Machine

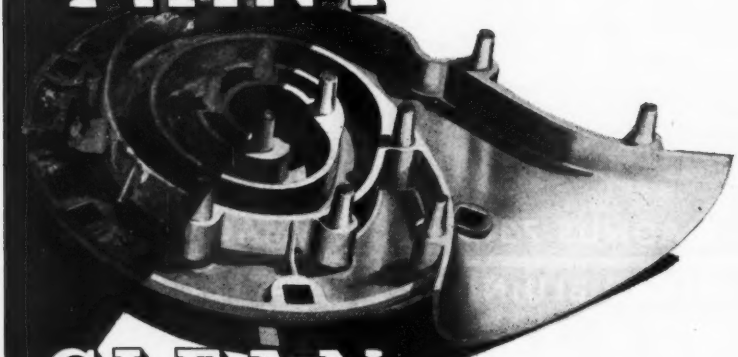
On practically every metal cleaning operation, the Magnus Aja-Dip Cleaning Machine and the Magnus Cleaner designed for the particular work, metal and dirt involved, will speed up cleaning by a surprisingly large margin. Moreover, you will get greatly improved cleaning results.

This is due to the vigorous, many times repeated "swishing" contact of the cleaning solution with all surfaces *and recesses* of the work that is provided by the Magnus method of raising and lowering the work *in* the solution.

Magnus MAGNUS CHEMICAL CO. 41 SOUTH AVENUE, GARWOOD, N. J.

Cleaners • Methods • Machines

REMOVE PAINT



CLEAN METAL with FIDELITY

Stripping and Cleaning Compounds

No matter what the surface looks like, the right Fidelity product will restore it to clean metal in record time!

Coats of paint and enamel break loose easily with the proper stripper. Grease and grime quickly dissolve with the correct cleaner. The result is a perfectly clean surface, ready for any type of finishing.

Call in a Fidelity service engineer today for a free survey of your cleaning requirements. His recommendations will help to step up efficiency in your plant.

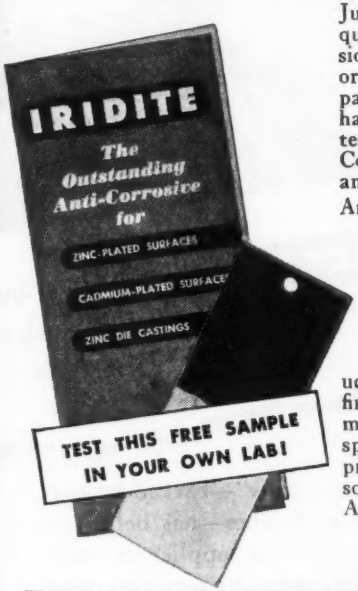
FIDELITY CHEMICAL PRODUCTS CORP.

"Serving industry with cleaning and stripping compounds"

430 RIVERSIDE AVE.
NEWARK 4, N. J.
HUmbolt 3-3640

We've got to beat CORROSION
That's easy: put in IRIDITE

Send for FREE test panel. See for yourself how IRIDITE protects zinc and cadmium—yet applies and dries in a few seconds.



Just mailing the coupon below brings you the quick, simple answer to the problem of corrosion on cadmium plating, zinc die cast, plated or galvanized products. You'll receive a zinc panel, half of it treated with Iridite, the other half not. Give the whole panel any corrosion test you wish, right in your own laboratory. Compare the two halves—and there's your answer.

And that's just part of the story. The rest is the speed and ease with which you can give your products Iridite's all-out corrosion resistance. Fifteen to sixty seconds of simple dipping at ordinary shop temperatures. A few seconds for drying and your product is ready for handling, packing and shipping.

Use Iridite as a paint base and your products hold their paint permanently. Use it as final finish and its attractive colors bring you more sales. Many big manufacturers already specify Iridite for their present or future products. They began as you will, by comparison-testing a sample in their own laboratories. Attached coupon will bring it to you. Act today.

RHEEM RESEARCH PRODUCTS, INC.
IRIDITE
2523 Pennsylvania Ave., Baltimore, 17, Md.

RHEEM RESEARCH PRODUCTS, INC.
705 Chemical Building,
2523 Pennsylvania Avenue,
Baltimore 17, Md.

Gentlemen: Please send me a free test panel of Iridite-treated zinc plate and full information and operating details.

Name.....
Company.....
Address.....
.....

A ZAPON WAR DRAMA IN THREE ACTS . . .

ACT 1: Vitally needed flash primer production for shells hobbled by old-time production method. Holes, through which powder charge is set off, had to be sealed against moisture with pitch by mussy hand method.

ACT 2: Zapon laboratories develop new Purple Sealing Lacquer which can be applied by production machines.

ACT 3: Result—Six operators now do the work of 46! Production increased 700%!

This is just one example of how Zapon "know how"—backed by over fifty years of experience in perfecting *better* finishes—has helped to save vital man hours and increase production of war supplies. It's why, too, Zapon's war job must come first. But after Victory this same knowledge and experience will again be yours to command in the solving of *your* finish problems.

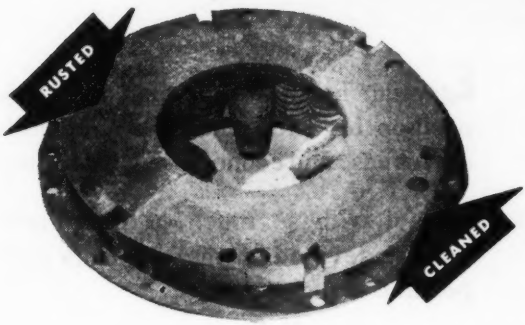
ZAPON

REG. U.S. PAT. OFF.

ZAPON DIVISION
ATLAS POWDER COMPANY
Eastern Sales: Stamford, Conn. Western Sales: No. Chicago, Ill.

SPECIALIZED PRODUCTION FINISHES . . . *Doing Tomorrow's Job Today*

FAST, EFFECTIVE RUST REMOVAL BY *Surface Chemistry*



Turco W.O #1, through Surface Chemistry , minimizes pre-cleaning and makes neutralizing treatment unnecessary. One continuous operation reconditions metals, passivates surface, prepares it for durable rustproofing or painting.

Contains no abrasives, requires neither scouring nor sanding. A short dip in Turco W.O. #1, or a brief wiping makes rust disappear. The wetting properties of Turco W.O. #1 enable it to penetrate screw threads, grooves and crevices which could not be reached any other way.

W.O. #1 wets out and removes minor soil deposits. It is not hindered by presence of light oil film. Unless work is heavily soiled, precleaning is unnecessary.

W.O. #1 deposits an absorbent phosphate film on the surface of the work which bonds tenaciously with primer, paint and rust-proofing compounds.

A W.O. #1 treated surface is therefore not only clean and free of rust, but ready immediately for final processing. One trial will prove it.

Write for full particulars about Turco W.O. #1, another Turco development in *Surface Chemistry* .

TURCO

INDUSTRIAL CHEMICAL COMPOUNDS

TURCO PRODUCTS, INC. • Main Office and Factory: 6135 S. Central Ave., Los Angeles 1 • Offices and Factories: 1006 Homberlin St., Houston 10, Tex. 125 W. 40th St., Chicago 9 • Offices and Warehouses: All Principal Cities

PAST...
PRESENT...
FUTURE...
Egyptian finishes held high pre-war position for excellence, for adaptability, for ease and economy of application.
Today, with so much of Egyptian's volume devoted to war, the same high position is maintained.
Isn't that a promise that when war's restrictions are lifted, Egyptian's position in the finish field will continue as it is... and long has been? We think so.
THE EGYPTIAN LACQUER MANUFACTURING COMPANY
ROCKEFELLER CENTER, NEW YORK 20, N. Y.
Inquiry regarding your post-war finish needs is invited.
EGYPTIAN FINISHES
EGYPTIAN
SPECIALIZED PRODUCTION FINISHES

Half Done Jobs Cause Double Trouble

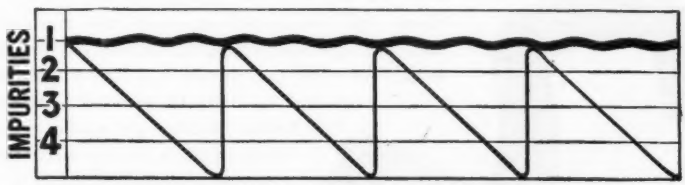
—Do the Whole Job and Do it Right

Clean the metal first, that's important—and it's equally important to use a plating bath free of impurities. Both are necessary for quality plating. Production troubles begin,—time and labor costs are too high,—when half done jobs must be done over.

Darco S-51 activated carbon guards against plating troubles due to solution contaminants—it adsorbs greases, oils, soaps, colloids and decomposition products—visible and invisible impurities that cause pitting, spots and poor adhesion.

A Scotsman for thrift, Darco purifies 100 gallons of solution a week for a few cents. Darco is the standard carbon of electroplaters who work with many metals—bright nickel, cyanide zinc, cadmium, copper, iron, gold and silver.

Write for a sample of Darco today, or order a supply from your dealer. And, whenever you have a purification problem on which you need help, ask us for assistance.



Continuous filtration with Darco protects the metal against random contamination during plating. Compare the low impurity level, when filtration is continuous, with the saw-tooth purity curve of intermittent filtration. Adsorption of organic additive agents can be minimized by a simple procedure.

(This trademark identifies the genuine. Accept no packages without it.)

DARCO

DARCO CORPORATION

60 E. 42nd Street, New York 17, N. Y.

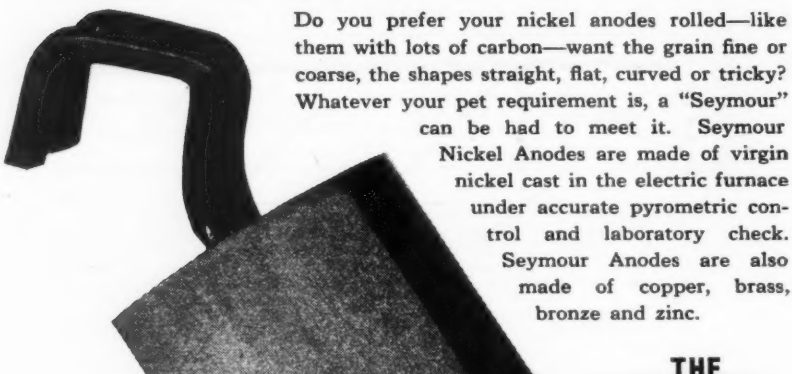
Is Your Plating Bath as Clean as the Water Used in Your Final Rinse?

DARCO—REG. U. S. PAT. OFF.

SEYMOUR

NICKEL ANODES

What Is Your Preference in Anodes?



Do you prefer your nickel anodes rolled—like them with lots of carbon—want the grain fine or coarse, the shapes straight, flat, curved or tricky? Whatever your pet requirement is, a "Seymour" can be had to meet it. Seymour Nickel Anodes are made of virgin nickel cast in the electric furnace under accurate pyrometric control and laboratory check. Seymour Anodes are also made of copper, brass, bronze and zinc.

THE SEYMOUR MFG. CO.
SEYMOUR, CONN.

UNTREATED ZINC
—No "life" in the finish—easily tarnished.

CLEAR ANOZINC
— it's got zip — stays clear and bright.

YELLOW ANOZINC
— for applications where a slightly iridescent yellow is desired.

BLACK ANOZINC
—use it where you want a deep, lustrous black.

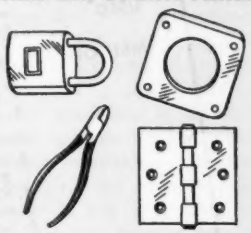
PICK ANOZINC* for low-cost, decorative finish

Unretouched photo shows the slight effect of constant handling over a period of 18 months on pieces treated in the Anozinc bath. Zinc plating identical on all pieces.

When zinc plated parts are finished in a Clear Anozinc bath they keep their sparkle and "zing"—as the photo above shows. It's an inexpensive anodic treatment that retains the appearance of new zinc plating—holds its lustre and attractive appearance—extends its resistance to corrosion and handling—*immeasurably.*

So why use a quickly tarnished finish when this fast, simple procedure will keep your zinc plate dressed up—at low cost? Use the Clear Anozinc bath to produce a finish that's an able pinch-hitter for chromium or cadmium—or wherever better appearance and a more durable zinc surface makes your products more serviceable. Write to the nearest office for further information, giving a brief outline of your application.

CLEAR ANOZINC FOR DIE CAST OR STEEL PARTS THAT CAN BE ZINC PLATED



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CHROMIUM PLATING for wear-resisting, oil-retaining and other types of finishes.

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2. Cold water spray rinse.

PART 2—ANODIC CLEANING

3. Use Pennsalt K-7 at 50 to 100 amps./sq. ft. at 8 oz./gal., 200° F. for 30 seconds.
4. Hot water rinse.
5. Muriatic acid dip.
6. Cold water rinse.
7. Zinc Electroplate.
8. Hot water rinse.
9. Hot "Iridite" dip and then dry air.

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BRASS PLATING FOR RUBBER ADHESION

BY W. HAYFORD AND H. S. ROGERS

ABSTRACT:

Brass plating as a means for adhering rubber to metal is discussed and applications listed. Adhesion is dependent on depolymerization of the rubber stock together with the formation of a copper-sulfur linkage. The critical factors in brass plating which affect the adhesion to rubber are indicated. A method for controlling the plating solution is given.

GENERAL:

Brass plating as a means for obtaining adhesion between rubber and metal has been used commercially since 1923. Since that date, approximately 50 patents and 20 major articles have appeared in the United States on brass plating and rubber to metal adhesion. A list of the general type of products in which rubber-metal adhesion is required includes vibration mountings, valves, bumpers, flexible couplings, gaskets, wheels, pulleys, hose, pump impellors, oil well requirements, pipe and tank linings, plating racks, and insulators. It is evident above that there are two general classes using either the elastic or protective properties of rubber.

Brass plating is still the most widely used commercial method of obtaining rubber-metal adhesion. The use of adhesives is necessary and increasing, since the plating process limits the size of the items which can be adhered and materials to some metals and some synthetic rubbers which can be processed. Brass plating for adhesion is adaptable for low carbon steels, some alloy steels, cast and malleable iron, brass, bronze, and manganese steel. High chrome and high silicon as well as some aluminum alloys which are not generally processed by this method are adhered to rubber by adhesion cements. Compounds of natural rubber, neoprene, buna-N and butyl can be adhered to brass plate if they are specially compounded for this purpose.

Brass plating has had wide acceptance because of several important characteristics. The strength of the rubber-brass plate bond can be as high as 1000 p.s.i. in tension. This value will vary according to the rubber compound and manufacturing conditions. Several rubber companies quarantee a minimum of 250 p.s.i. for brass bonded items. The adhesion is not noticeably influenced by temperatures from —60° F. to + 212° F. and is resistant to all conditions which the rubber and metal themselves will withstand. Failure of the brass bond over a steel base is critically influenced by corrosive conditions. This is due to the electrolytic couple existing between the highly active brass and the steel, the action of which may be minimized by suitable lacquers. The use of brass base material will also minimize this condition.

The ease of application of the brass plate to the base metal is evident since the plating conditions are similar to other types of plating. The brass plating may be done

Read at Newark Branch Meeting, Feb. 16, 1945.

in still or barrel tanks and is adaptable to either semi- or fully automatic operation.

The process of producing rubber to metal bonded items by brass plating includes the following elements:

1. Clean and brass plate the metal.
2. Mold rubber to metal under heat and pressure to vulcanize the rubber in required shape and obtain adhesion.

THEORY OF ADHESION:

The adhesion of rubber to brass depends on two chemical reactions. To understand these it should be noted that special rubber compounds as well as a critical type of brass plate is required. The rubber or synthetic rubber stock must be compounded with sulfur specifically for brass adhesion. The brass plate must be a highly active brass alloy. The copper content should be maintained between 65-80% and the brass crystal should be highly strained.

The rubber in contact with the brass plate is depolymerized by the copper in the brass.

This degredation of the chain molecule makes available certain forces for adhesion. In addition a copper-sulfur linkage occurs which is essential for high adhesion.

From the above it would seem that copper alone would be sufficient to activate the adhesion reactions. A weak bond would result due to the severe depolymerization which occurs. The presence of zinc acts as a dilutent of the copper and also provides a crystal interface for chemical attack. The brass crystal should be highly strained so that the crystal is as "active" as possible. This necessity for a highly strained crystal was proven by experiments of the following nature:

1) A cold rolled strip of unplated commercial high yellow brass (65% copper) gave good adhesion to rubber. This brass was annealed in an inert atmosphere at various temperatures until all the strain had been removed. With anenaling the adhesion became progressively less, until there was no adhesion to the completely annealed material.

2) Brass was deposited from two different plating solutions in such a manner that the resultant plates were of identical composition. One plate was highly strained, the other had less crystal strain. The adhesion to the first sample was approximately five times that of the unstrained samples.

BRASS PLATING FOR ADHESION:

The variables encountered in the plating process include total metal content, copper-zinc ratio, free cyanide content, ammonia content and Ph of the bath, as well as temperature, current density, and filtration. A brass plating bath suitable for consistently satisfactory rubber adhesion work might have the following make-up:

	ozs./gal.
Copper (metal)	3.0
Zinc (metal)	.30
Free Na CN	1.5
Ammonia (NH_3)	.3
Ph	9.5
Sod Bicarbonate (as Carbonate)	5-10

This solution may be operated at 7-15 ASF at 75-90° F with continuous filtration. The deposit should be approximately 75% copper; the color is unimportant. This solution is noteworthy for the following reasons:

Cu-ZN Ratio = above 4-1, free cyanide = 1.5 or under, ammonia = .3 oz./gal. or above. Ph = 9.5 or below. The advantages of such a solution will be apparent on consideration of the critical variables separately.

The *total metal content* is not critically limited. The customary effects of decreased electrode efficiencies, and reduction of throwing power do not influence the rubber adhesion properties. On changing the total metal content, the change in free cyanide content and Ph exert a more important influence.

The *copper-zinc* ratio in the plating solution has a most important effect on the plating conditions. By increasing the copper content, the percentage of copper in the deposit is increased.

By increasing the ammonia content the effect of the copper-zinc ratio in the solution on the % copper deposited is nullified.

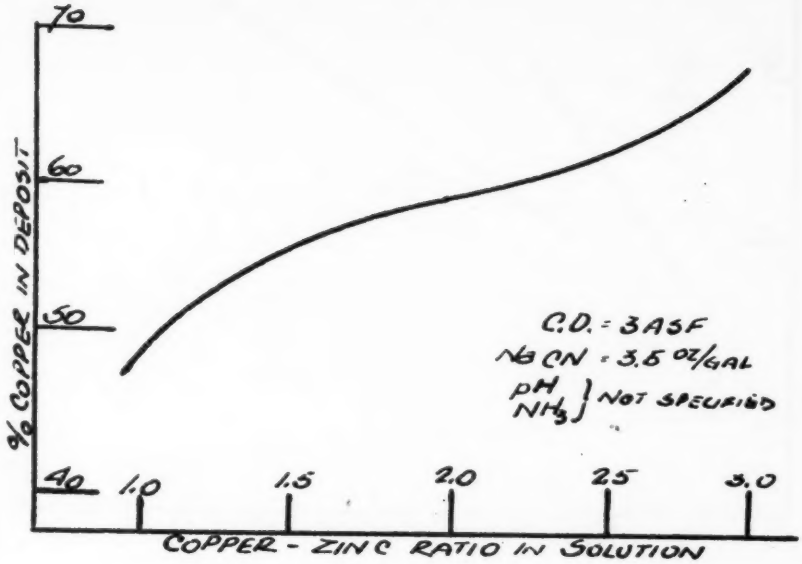

Figure 1

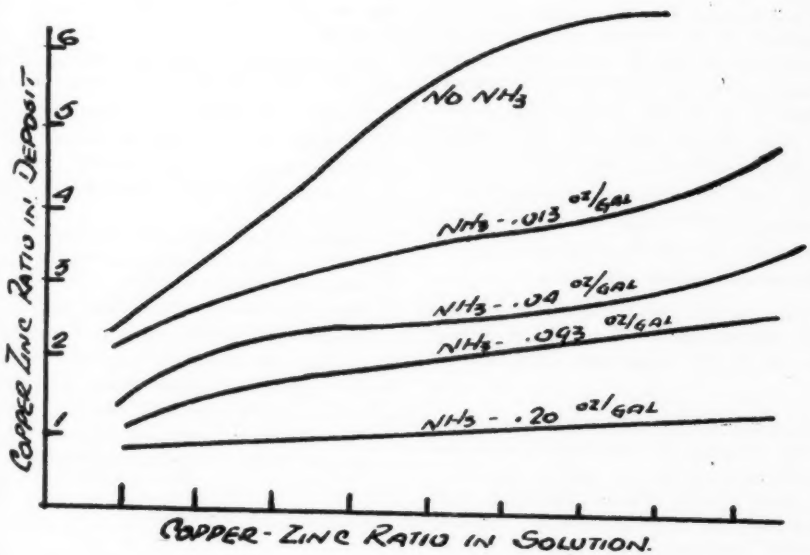

Figure 2

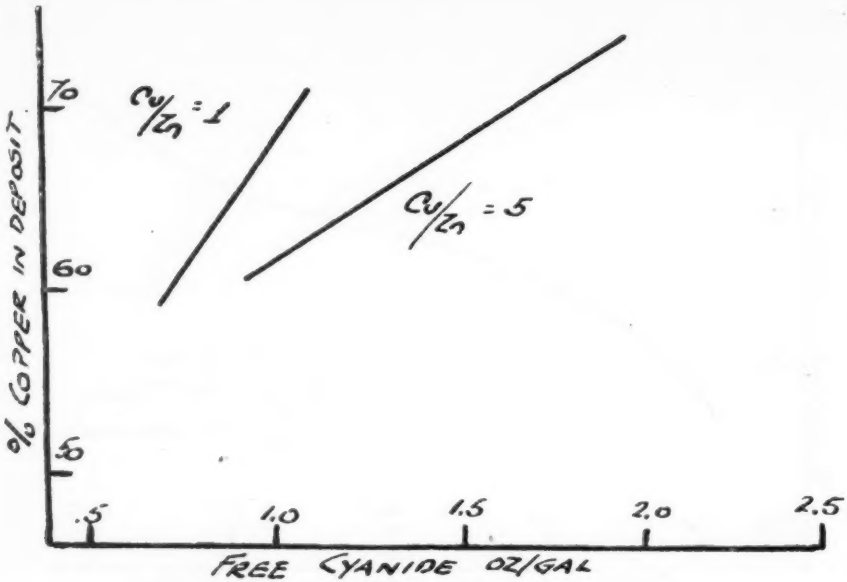

Figure 3

Free sodium cyanide is defined as that amount of cyanide calculated as sodium cyanide which is present in the solution and not combined in the copper and zinc-complexes. It is difficult to measure this variable and is done by measuring the total cyanide content and subtracting the amount estimated to be tied up with the copper and zinc. By increasing the free cyanide content the following results are noted.

1. Decrease in metal ion concontration.
2. Increase in % copper in deposit.
3. Decrease in cathode efficiency.
4. Increase in anode efficiency.

Figure 3 describes the effect of free cyanide content on the % copper in deposit referred to the copper-zinc ratio in solution.

Ammonia is generally added to a new or idle solution and will build up on continued operation to an equilibrium value. The most striking effect of ammonia is its effect on the current density variable. Without ammonia, the current density places critical limits on the plating process due to the extremely limited range of 4-10 ASF in which adhesion brass can be plated.

When using a high ammonia content in the plating solution, a low zinc content is advisable. This is due to the tendency for zinc to precipitate as the ferri-ammonia complex.

By increasing the ammonia content, then, the following changes may be expected.

1. Decrease in metal ion concentration.
2. Decrease in % copper in deposit.
3. Stabilizes color of the deposit.
4. Increases Ph slightly (unbuffered solution).
5. Nullifies effect of current density.
6. Nullifies effect of copper-zinc ratio.
7. Increases cathode efficiency.
8. May cause zinc to precipitate out.

The pH of the solution may be controlled by setting up a sodium carbonate-bicarbonate buffered condition. With increasing pH the following effects are noted:

1. Decrease in % copper in deposit.
2. Decrease in metal ion concentration.

CONTROL:

Summarizing the above discussion the variables usually encountered in brass plating which influence the deposition of a

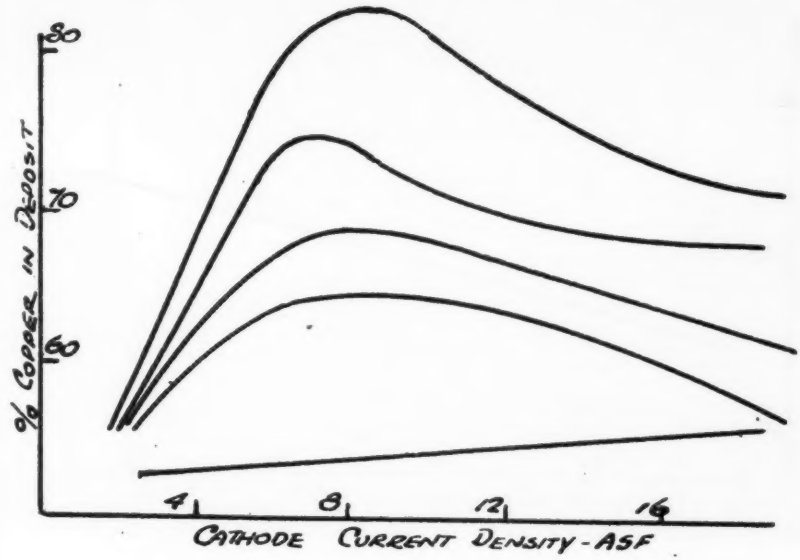

Figure 4

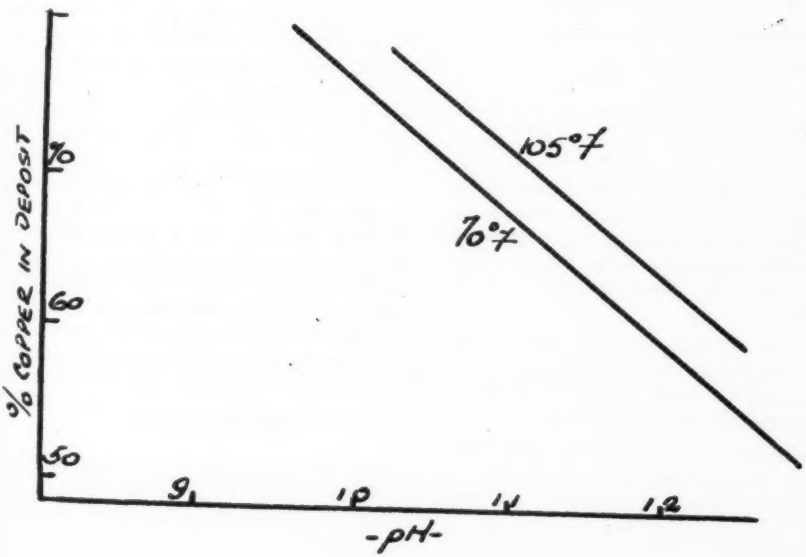

Figure 5

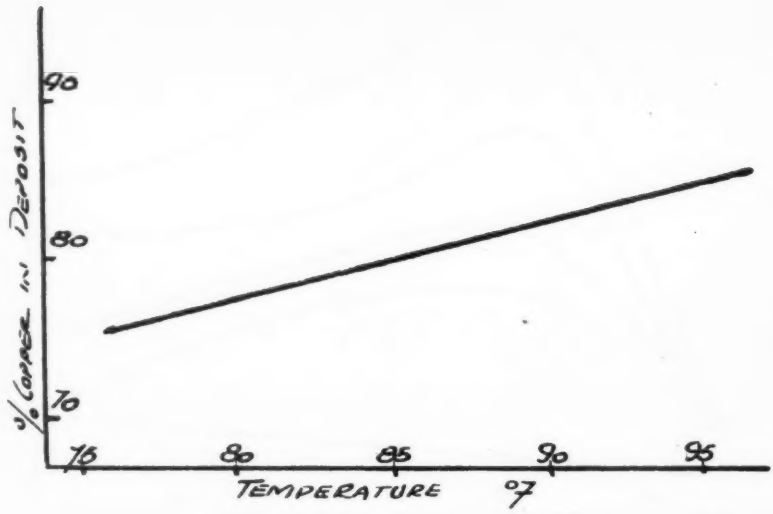

Figure 6

plate of a given composition are:

1. Copper-zinc ratio in solution.
2. Free cyanide.
3. Ph.
4. Ammonia.
5. Current density.

Data presented has shown that in the presence of at least 0.3 oz./gal. of ammonia, the effect of variation in the copper-zinc ratio and current density is rendered negligible and that close control is not required.

The free cyanide, the Ph, and the ammonia can be fixed at required values and maintained by regular additions based on routine control analysis.

The temperature can then be varied from 75-100° F. to obtain a range of 10% in the copper content of the plate.

The brass plating process is generally done by the rubber manufacturer who is processing the article. This is done because of the special type of brass plate required, the simplification of scheduling and the benefits of centralized responsibility. However, there is no reason why the job plater cannot furnish a suitable brass plate for rubber adhesion purposes. In this process, a heavier brass plate should be deposited which is reactuated by the rubber processer prior to use by dipping in 2% sodium cyanide.

The job plater should be protected by an agreement that the quality of his plating shall be such that a certain adhesion value is obtained by molding a standard sample within 24 hours after plating. The jobber should not guarantee adhesion under uncontrolled or unfavorable conditions as there are other variables than the plate which influence the final adhesion obtained.

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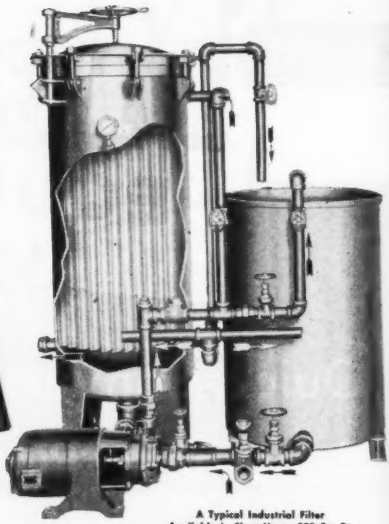

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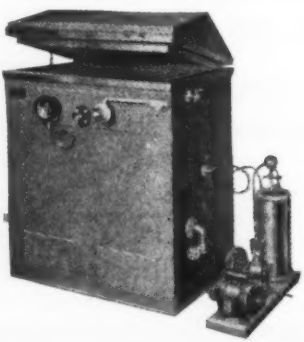

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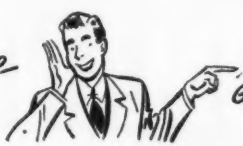

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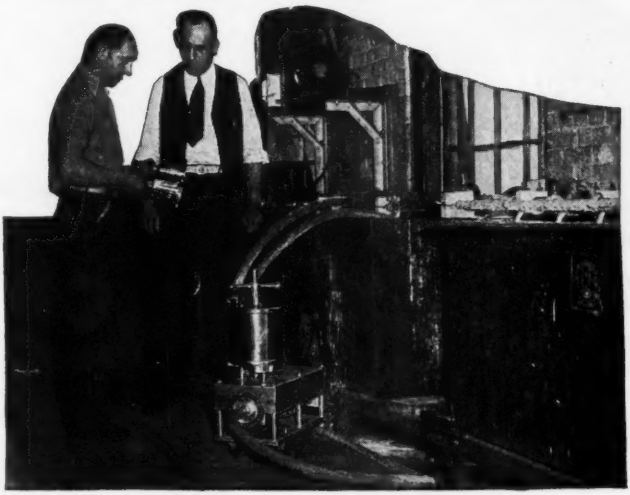

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BRIGHT NICKEL PLATING

BY VIRGIL H. WAITE

THE use of bright nickel plating baths increased rapidly from 1935, when the first large scale production installation was made, until shortly before the outbreak of war. At that time well over a million gallons of bright nickel solution were in operation on a wide variety of parts and new installations were being made.

The rapid growth of bright nickel plating was due to several factors, the most important being the substantial reduction in operating costs brought about by the elimination of nickel buffing. This made it unnecessary to deposit nickel to thicknesses from 10 to 20% over specification to compensate for the amount removed by buffing, it eliminated one cleaning operation and reduced re-racking.

War restrictions on the use of nickel put an end to decorative plating and, at the present time, these restrictions are still in force. However, this condition is temporary and with the return of peace bright nickel plating will be resumed on a large scale. To assist electroplaters in planning for this event, a brief review of the factors involved in the installation and operation of a bright nickel bath is presented.

Equipment

In general, equipment requirements for bright nickel plating are the same as for operation of low pH dull nickel solutions. The principal difference is in the selection of materials of construction to avoid contamination of the bright nickel baths.

Bright nickel plating may be carried out in still tanks, although best results are obtained with some form of cathode agitation. Movement of the cathodes in full and semi-automatic equipment or by use of reciprocating cathode rods in non-automatic equipment provides sufficient agitation. Rate of travel varies from 3 to 15 feet per minute.

Plating tanks should be lined to avoid contamination of the bright nickel solution and experience has shown that properly compounded rubber is the best material for this purpose. Some of the commercially available rubber linings are unsatisfactory because they are acted on by the bright nickel solution to yield objectionable impurities. For this reason, rubber should be tested before being used in bright nickel. Wood and lead-lined tanks are not satisfactory.

The bright nickel solution may be heated by circulation through an external heat exchanger or by means of coils placed in the plating tank. The heat-exchanger is usually employed in the larger installations and in most instances a filter is arranged in series with the heat exchanger. In this way, suspended particles of dirt, etc., are continuously removed from the solution as it

is being heated. The solution should be returned to the plating tank at a point below the solution level to prevent formation of foam. If the plating tank is long, solution should be returned at several points. A by-pass around the filter will provide for cleaning of the filter without interruption of the plating operation. Heat exchangers of Duriron, carbon or glass are suitable. Lead may be used if nickel chloride concentration does not exceed 8 oz./gal. The circulating pump may be Duriron or rubber covered steel (or lead with low chloride solutions). The cylindrical tank type filters are satisfactory providing surfaces in contact with the bright nickel solution are non-contaminating. Stainless steel and Monel metal has been suggested for this service, but experience has shown that both are objectionable.

If heating is carried out in the plating tank, carbon coils may be used.

Control instruments on the plating tank should include an ammeter and a temperature indicator. In addition an ampere hour meter is helpful in determining time for making brightener additions. The consumption of addition agents is roughly proportional to the number of ampere hours passing through the plating solution and once this factor has been established, additions can be timed by the ampere hour meter.

An occasional purification of the bright nickel solution will be required and equipment for this operation will include a tank, a pump and a filter. The tank should have a capacity approximately 25% greater than the volume of bright nickel plating solution to be treated. Some form of agitation should be provided. The requirements for pump and filter are as described above except that holding capacity of the filter for purification service should be greater.

Plating racks for use in bright nickel plating should be coated with materials of an approved type to avoid contamination of the solution. Good rack construction and maintenance is likewise important from the standpoint of favorable drainage characteristics and plate distribution.

Preparation of the Work

A bright nickel deposit tends to be smoother than the surface on which it is placed, the effect becoming more pronounced as the thickness of coating is increased. However, pronounced irregularities in the subsurface are not covered up by thicknesses ordinarily employed and these should be eliminated before bright nickel plating.

Die-castings are color buffed and given an undercoating of electrodeposited copper. The copper must be uniformly fine grained if the bright nickel plated castings are to go directly into chrome. Brass parts are finished by buffing. The treatment of steel parts will depend upon the relative cost of polishing the steel and of buffing electrodeposited metal. If the cost of obtaining a satisfactory finish on steel is excessive, the parts may be copper plated and copper buffed to obtain the desired finish.

To obtain full lustre, thorough cleaning of the work is required prior to bright nickel plating. The bright nickel surface magnifies irregularities in cleaning which would pass unnoticed in dull nickel deposits. The choice of cleaner will depend upon the metal to be cleaned and the type of film to be removed. Particular attention should be paid to the cleaning of recessed areas. Satisfactory cleaners are available for use on all of the common base metals.

The selection and care of acid dips is likewise important in the preparation of work for bright nickel plating. Muriatic acid is usually employed for this purpose, the concentration being governed by the metal to be processed. The acid dips should be kept clean at all times and acid strength should be maintained.

Efficient rinsing is essential both before and after the acid treatment.

Plating Bath

Bright nickel plating is carried out in a modified Watts type solution to which is added brighteners and an anti-pitting agent. Typical composition would be:

Single Nickel Salts	40-50 oz./gal.
Nickel Chloride	6- 8 oz./gal.
Boric Acid	5- 6 oz./gal.

The amount and type of brighteners depends upon the particular process being used. A wetting agent is usually added to eliminate pitting, hydrogen peroxide being unsatisfactory because of its adverse effect on the organic brighteners. The bath operates over a comparatively wide range of conditions as follows:

pH	2.5-4.0
Temperature	110-150° F.

Cathode Current Density
15-100 amp./sq. ft.

The optimum values for operating conditions in a given bath will depend upon several factors including the type of work being plated, agitation or rate of cathode movement, rate of deposition, etc. Once established, these values should be maintained within narrow limits.

High purity nickel anodes should be used and the anodes should be bagged to prevent anode sludge from getting into the bath.

Maintenance of the Bath

All constituents of the bath will require replenishment from time to time. Best practice is to make frequent small additions rather than occasional large ones. Brighteners are added on the basis of the amount of work put through the tank and, in addition, the brightener concentration is determined periodically by analysis. Additions of anti-pitting agent are usually governed by the appearance of the deposit with an occasional analysis to make sure that concentration does not exceed recommended limits. Nickel, chloride and boric acid are maintained by analysis in the usual manner.

Nickel sulfate, nickel chloride and boric acid may be placed in treated addition bags and then suspended in the plating bath to dissolve. Optionally, they may be dissolved outside the plating tank, adding the solution to the bath. Direct addition of solids to the bath is not recommended.

Every effort should be made to prevent contamination of the bath with impurities both organic and inorganic. Organic impurities may be extracted from anode bags, from bags used in making chemical additions, from filter cloths, from rack coatings and from tank linings. Other sources of organic contamination include air borne dust, lubricant from conveyors and improperly rinsed work. Inorganic impurities which may cause trouble, if present in sufficient amounts, include chromic acid, copper, lead, iron, aluminum and alkali and ammonium salts. Allowable limits for these impurities will vary with different processes and operating conditions.

Methods for purification of bright nickel baths are available and contaminated baths can be cleaned up readily. Organic impurities usually yield to treatment by activated carbon while most inorganic impurities can be precipitated at a high pH and removed by filtration. Chromic acid must be reduced to the trivalent state before the high pH treatment, while ferrous iron should be oxidized prior to treatment. Copper is removed by deposition at low current densities. Alkali and ammonium salts cannot be removed.

Properties of Bright Nickel

Bright nickel is harder, finer grained and somewhat less ductile than dull nickel obtained from a Watts type bath. The protective value, as determined by outdoor exposure tests, is at least equal to that of dull nickel.

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THE FUNDAMENTALS OF CHEMISTRY FOR ELECTROPLATERS

PART XIX

THE PRINCIPLES OF ACID-BASE ANALYSIS

Samuel Glasstone, D. Sc. Ph. D.

Equivalence of Acids and Bases

THE information obtained in the preceding articles, concerning the neutralization of acids and bases to form salts and the possibility of the hydrolysis of these salts, leading to acidic or alkaline reactions, can be utilized to explain the procedures commonly used for the quantitative (volumetric) analysis of solutions of acids and bases. The neutralization of hydrochloric acid (HCl) by sodium hydroxide (NaOH) may be represented by the equation

$$(1)\ HCl + NaOH = NaCl + H_2O.$$

Actually, as seen in Part XVII (*Monthly Review*, March 1945), the acid, base and salt (NaCl) are all considerably ionized in solution, so that the reaction actually takes place between ions, i.e.,

$$(H^+ + Cl^-) + (Na^+ + OH^-) = (Na^+ + Cl^-) + H_2O,$$

but this aspect of the problem need not concern us at present. The equation (1), in which the common chemical formulas are used, are satisfactory for our purpose. If a solution of sulfuric acid (H_2SO_4) is neutralized by sodium hydroxide, the reaction may be written

$$(2)\ H_2SO_4 + 2NaOH = Na_2SO_4 + 2H_2O.$$

In comparing equations (1) and (2) it is seen that whereas it requires one molecule of sodium hydroxide to neutralize one molecule of hydrochloric acid, two molecules of the former are necessary for the neutralization of a molecule of sulfuric acid. The reason for this difference is obvious from what has been stated in Part XI (September 1944): the molecule of sulfuric acid has two atoms of replaceable hydrogen, while hydrochloric acid has one such atom. It follows, therefore, that for every atom of replaceable hydrogen in the molecule of acid, one molecule of sodium hydroxide is required for neutralization. This result may be generalized in the conclusion that one molecule of sodium hydroxide neutralizes that quantity of any acid which contains one atom of replaceable hydrogen. Expressed in grams, this latter quantity is called the equivalent weight of the acid, because it contains one equivalent weight of the element hydrogen (see Part II, December 1943), upon which the essential properties of the acid depend. In the case of hydrochloric acid, which contains one atom of hydrogen to the molecule, the equivalent weight is identical with the molecular weight, i.e., 1 (for H) + 35.5 (for Cl), which is 36.5 grams. The same is true for any acid which contains one replaceable hydrogen atom in the molecule, e.g., nitric acid (HNO_3), and also for acid salts, such as sodium bisulfate ($NaHSO_4$) and sodium bicarbonate ($NaHCO_3$), which can be further neutralized to give normal salts (Part XI, September 1944). Since sulfuric acid (H_2SO_4) contains two atoms of replaceable hydrogen in the molecule, the equivalent weight is one-half the molecular weight, i.e., ½ [2 × 1 (for 2H) + 32 (for S) + 4 × 16 (for 40)], which is ½ × 98, or 49 grams.

Equivalent Weight of Base

In accordance with the foregoing statements, it is clear that the same quantity of sodium hydroxide is required to neutralize the equivalent weight of any acid. This quantity is actually the molecular weight

of sodium hydroxide, but it is referred to in this connection as the equivalent weight of the base, since it neutralizes one equivalent weight of any acid. If the base had been calcium hydroxide, $Ca(OH)_2$, or barium hydroxide, $Ba(OH)_2$, the latter being quite frequently used in volumetric analysis, it would require only one-half a molecular weight to neutralize one equivalent of acid. The reactoin between barium hydroxide and hydrochloric acid, for example, is

$$(3)\quad 2HCl + Ba(OH)_2 = BaCl_2 + 2H_2O,$$

so that one molecule of barium hydroxide neutralizes two molecules of hydrochloric acid. In this case the equivalent weight of the base is one-half of the molecular weight. By adopting the definitions given above, it is possible to draw the important conclusion that one equivalent of any acid will exactly neutralize one equivalent weight of any base. The resulting solution, which contains only the salt of the given acid and base, is not necessarily "neutral" in reaction, as seen in the preceding article. However, since the system consists of equivalent amounts of an acid and a base, it is referred to as the "equivalence point."

Normal Solutions

A solution containing one equivalent weight of any acid or of any base in a volume of one liter is called a "normal" solution, represented by the letter N, or more exactly as 1.0 N. The concentration of any other solution may then be expressed as a fraction or multiple of normal. For instance, a solution of hydrochloric acid containing 3.65 grams in a liter would be one-tenth normal, written as 0.10 N. A solution of sodium hydroxide containing 5.04 grams of the base per liter would be $5.04/40.0 = 0.126$ N, since the equivalent weight of sodium hydroxide is 40.0, thus: 23 (for Na) + 17 (for OH). Any solution of definitely known concentration, usually in terms of normality, is known as a "standard solution."

A given volume of a N solution of any acid or base contains the same number of equivalents, and hence it can be stated that a certain volume of a N solution of any acid requires exactly the same volume of a N solution of a base for neutralization. This conclusion can be extended to apply to solutions which are not exactly normal; thus, a given volume of any solution of an acid will be exactly neutralized by the same volume of a base solution of the same normality. So far it has been supposed that the solutions of acid and base are of equal normality, but this is not necessarily the case. If the normalities are different, then it can be easily seen that the following relationship holds:

$$\text{Normality} \times \text{Vol. of Acid Soln.} = \text{Normality} \times \text{Vol. of Base Soln.}$$

Suppose, for example, we have 25 ml.* of a 0.1 N solution of an acid, and this is neutralized by a 0.15 N solution of a base; then by the formula given above it follows that

$$0.1 \times 25.0 = 0.15 \times \text{Vol. of base solution,}$$

so that the volume of the solution of base required for neutralization is $0.1 \times 25.0/0.15$, i.e., 16.7 ml. The calculation may be reversed so as to determine the normality of the acid (or base) solution if the volume of the other solution required for neutralization is known. Thus, suppose 25.0 ml. of a solution of an acid require 22.4 ml. of a 0.128 N solution of a base for neutralization; the normality of the acid is then given by

$$\text{Normality of acid} \times 25.0 = 0.128 \times 22.4,$$

so that the acid solution is $0.128 \times 22.4/25.0$, i.e., 0.115 N. If the identity of the acid, and hence its equivalent weight, is known, the exact weight in the solution can be evaluated. For example, if the acid in the case under consideration is sulfuric acid, equivalent weight 49 grams, the solution would contain $0.115 \times 49.0 = 56.3$ grams of sulfuric acid per liter.

Acid-Base Titration

There is thus available in principle a method for the quantitative (volumetric) analysis of a solution of an acid or base; two things are, however, required. First, there must be available a standard solution, i.e., one of known normality, of either acid or base for the analysis of base or acid, respectively. Such a solution is usual-

*It is the common practice at the present time to express volumes in terms of the milliliter (ml.), which is one-thousandth part of 1 liter. Although the ml. is insignificantly different from the cubic centimeter (cc.), it is nevertheless more correct to use the ml. in connection with standard solutions.

ly prepared by taking a definite weight of a pure acidic or basic substance and dissolving it in water so as to make a liter, or other definite volume, of solution. From a knowledge of the equivalent weight of the substance the normality of the solution can be readily calculated. The second requirement is a means for indicating when the equivalence point is reached in the addition of base to acid (or vice versa), so that the equivalent volumes may be determined. For this purpose a suitable indicator may be employed.

A known volume of the acid solution is placed in a vessel, such as a beaker and a small quantity of the indicator is added. The base solution to be used for neutralization is poured into a burette, which is a graduated tube for which definite volumes may be run off as required. The solution of base is run gradually into the acid until the indicator just changes its color. The mixture is then at, or very close to, its equivalence point, and the volume of base solution equivalent to the acid is read off from the graduations on the burette. The process just described is known to the chemist as "titration." Provided the normality of either acid or base is known, sufficient information is now available for calculating the normality (and concentration) of the other by the method described above.

Choice of Indicator

There is still to be considered the matter of the choice of the proper indicator. Actually the nature of the indicator depends on the type of acid and base involved in the neutralization titration. If the acid and base are both strong, the solution will be exactly neutral at the equivalence point (see Part XVIII, April 1945); hence, in theory, an indicator which changes its color at the neutral point is desirable. However, provided the solutions are not too dilute, the change from acid to alkaline (or vice versa) at the equivalence point is so very sharp that almost any indicator can be used to detect the attainment of this point in the titration of a strong acid by a strong base. Common indicators employed for the purpose are methyl orange, methyl red, phenol red and phenol phthalein. If the acid is weak then it should be titrated by a strong base; at the equivalence point the solution will be somewhat alkaline, as shown in the preceding article. It is necessary, therefore, to use an indicator which changes color on the alkaline side of neutrality; familiar indicators of this type are phenol phthalein, cresol red and tymol phthalein. If an indicator such as methyl orange or methyl red, the color of which changes on the acid side, were used, not only would the color change not be sharp, it would also not occur at the equivalence point, thus leading to incorrect results. For the titration of a weak base, it is necessary to use a strong acid; at the equivalence point the solution would still be somewhat acid, and the condition would be detected by a sharp color change in an indicator such as methyl orange as methyl red. If a weak acid were titrated with a weak base, the equivalence point would correspond to almost exact neutrality. However, in cases of this type the change from acidity to alkalinity, through neutrality, is so gradual that an indicator does not undergo a sharp color change. It is thus not possible to determine the end point with any degree of accuracy. For this reason the titration of a weak acid against a weak base is always avoided in analytical work.

It may be pointed out in conclusion that the preceding discussion has been general in nature, the purpose being merely to explain the fundamental principles. It is possible to treat the subject more rigorously so that the exact acidity or alkalinity, that is, the pH, of the solution at the equivalence point can be calculated and the best indicator chosen for the given acid and base solutions. This treatment is, however, outside the scope of the present series of articles.

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Annual Report of the Research Directing Committee

***A. KENNETH GRAHAM**

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DURING an award of the Perkins Medal some years ago, the Medalist stressed the importance of a careful scientific attack on problems, enthusiasm on the part of the investigators and an adequate sum of money in carrying on successful research. The Research Committee of the American Electroplaters Society and its sub-committees are at present engaged in an ambitious "Research Program" for its members and for the plating industry. Fortunately, the committee is favored with respect to these important essentials. The three Project Directors and their co-workers have been carefully chosen with respect to their scientific attainments and specific qualifications for the several projects involved. In cooperation with the A.E.S. Project Sub-committees they are enthusiastically pursuing carefully planned programs. This together with the growing response to the Society's fund raising activities, has encouraged the committee in the belief that results of value will be forthcoming.

By January 1st of this year, three projects were under investigation at the Universities of Illinois, Michigan and Indiana. At the coming meeting of the Research Committee, the many problems suggested by the membership of the Society that are being reviewed will be acted upon and it is expected that one or more additional projects of importance to a large portion of the Society's membership will be chosen. However, it is not possible at this time to predict how soon these additional projects can be started.

The first Progress Report on Projects 1, 2 and 3 appeared in February, March and April issues of the *Monthly Review*. In the June and July issues of the *Review*, completed bibliographies and a critical abstract of the literature references on these projects will appear. In the meantime, experimental work has already started.

Project No. 1 as a study of "Methods of Stripping Copper from Various Base Metals" is of importance to many platers and industrial concerns. It is expected to obtain data from this information on the effectiveness of various stripping methods. This involves the ability to remove various thicknesses of copper and the time required, as well as the extent to which the

base metal finish is preserved during stripping without excessive attack. Furthermore, information on the maintenance of the stripping baths, the possibility of salvaging the copper and various cost factors are involved.

A logical possibility with regard to Project No. 1 may be to include the stripping of other metals such as nickel, silver, etc. Furthermore, the application of these findings to the stripping of coatings for either the determination of their average weight or of their composition by analysis is also a possibility.

Project No. 2 on the "Analysis of Impurities in Plating Baths" has already become a matter of considerable importance in connection with bright plating, the plating of heavy deposits and particularly in the engineering applications of plating. Furthermore, if one is to study the effect of impurities on the properties of deposits, it is necessary to have methods for their analysis when present in small amounts in both the plating baths and the deposits. It is also possible that the analysis of trace elements in anodes may be improved by the methods developed.

The philosophy governing the conduct of this investigation is to endeavor to find methods requiring only limited expenditures for equipment. By so doing the methods can be used by many of the smaller industrial concerns and job shops without the need of too highly specialized technical skills or techniques.

Project No. 3 on an "Investigation of Methods of Testing Adhesion of Plated Coatings" is of primary importance in the manufacturing of many plated items. The development of a sensitive, non-destructive test for adhesion is sorely needed. Even a destructive test, if reproducible, sensitive and rapid, would greatly simplify our evaluation of various preplating cleaning cycle steps. Good adhesion is a fundamental of all good plating. Unfortunately, the attainment of our objective can not be predicted with too great assurance. However, it is felt that once a bibliography and critical abstract of the known methods and of the factors involved are obtained, experimental work of a preliminary nature is justified. A further extension of the projects would then be determined solely on the encouragement obtained in the preliminary investigation.

In concluding this report it should be emphasized that the desire of the Research Committee is to produce results of value to the greatest number of the members and supporting industrial concerns. Obviously, it may not be possible to work on projects that will be of interest to all members at any one time. If, however, a carefully selected list of worthwhile problems are obtained from the members, it is logical to expect that in the course of time results of value to all members will be forthcoming.

While the writer does not presume to speak for the chairman of the Research Committee, it should be emphasized that, in selecting projects for study, care will be exercised not to select those involving proprietory processes in which any considerable amount of private capital has been invested. As a consequence all projects will of necessity be of a general or fundamental nature.

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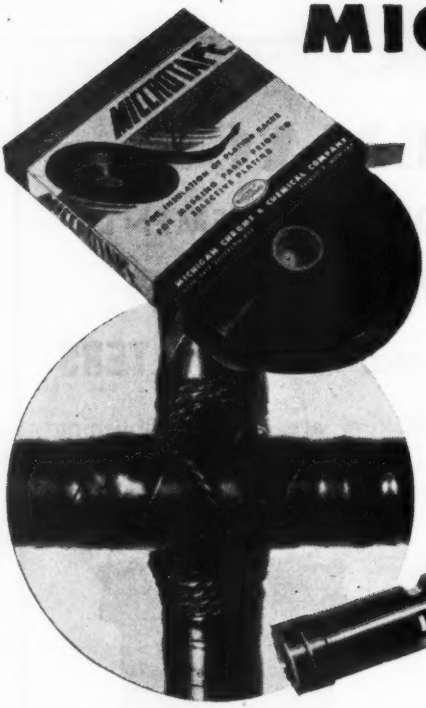
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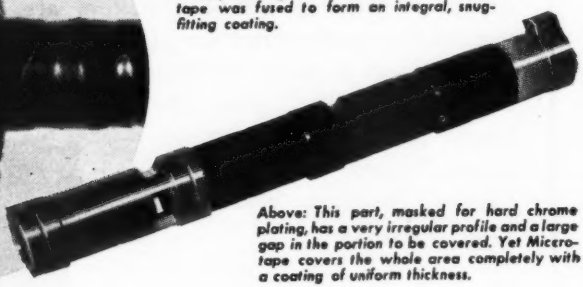

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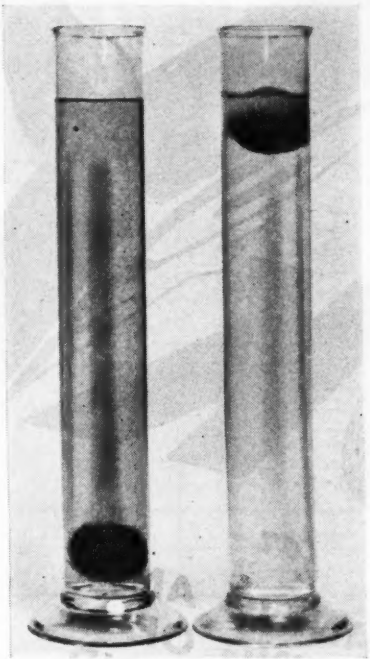

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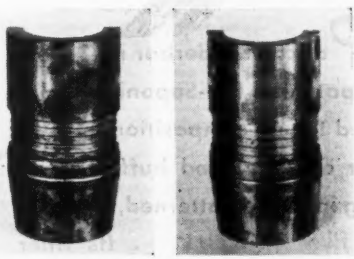

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COPPER	High Speed Copper	Flats; High Speed anode hangers
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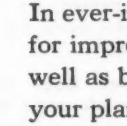

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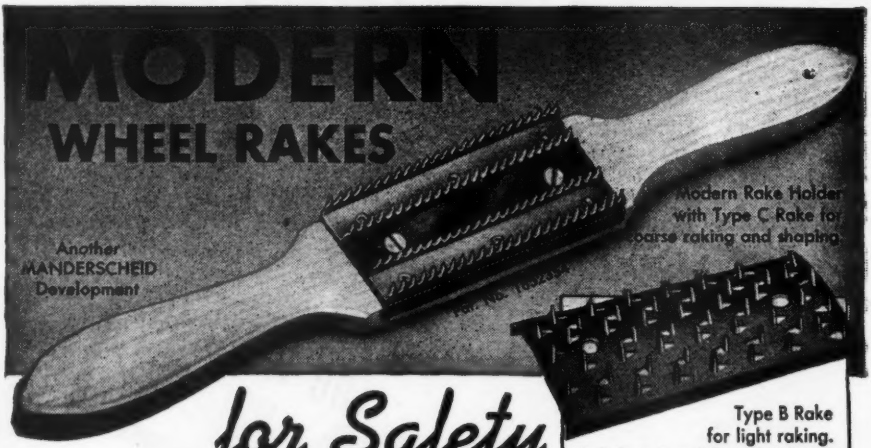

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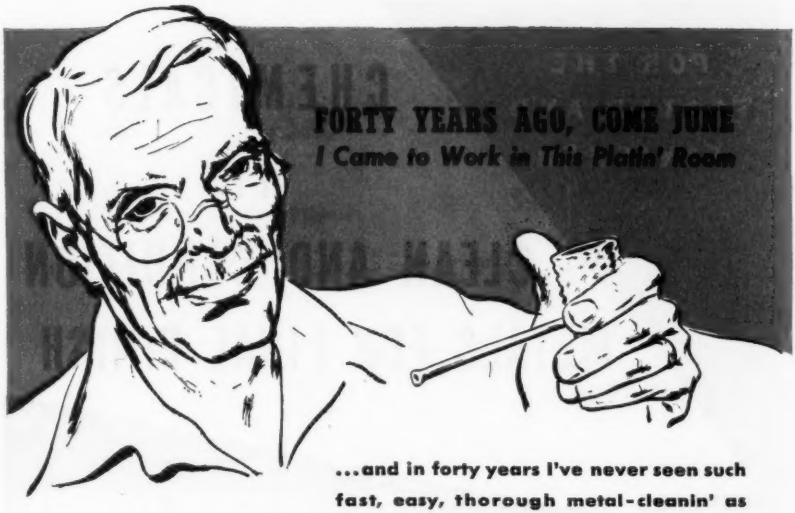

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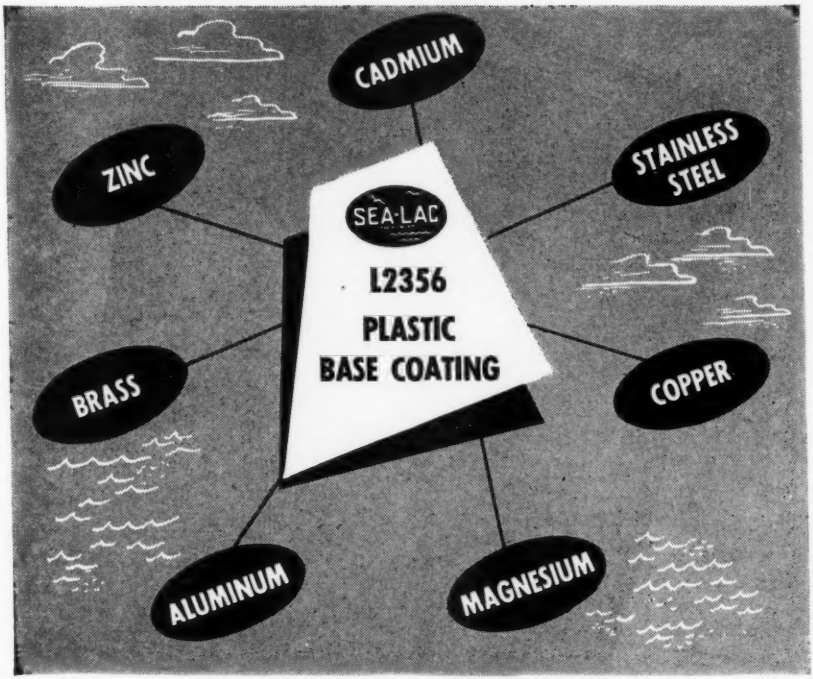

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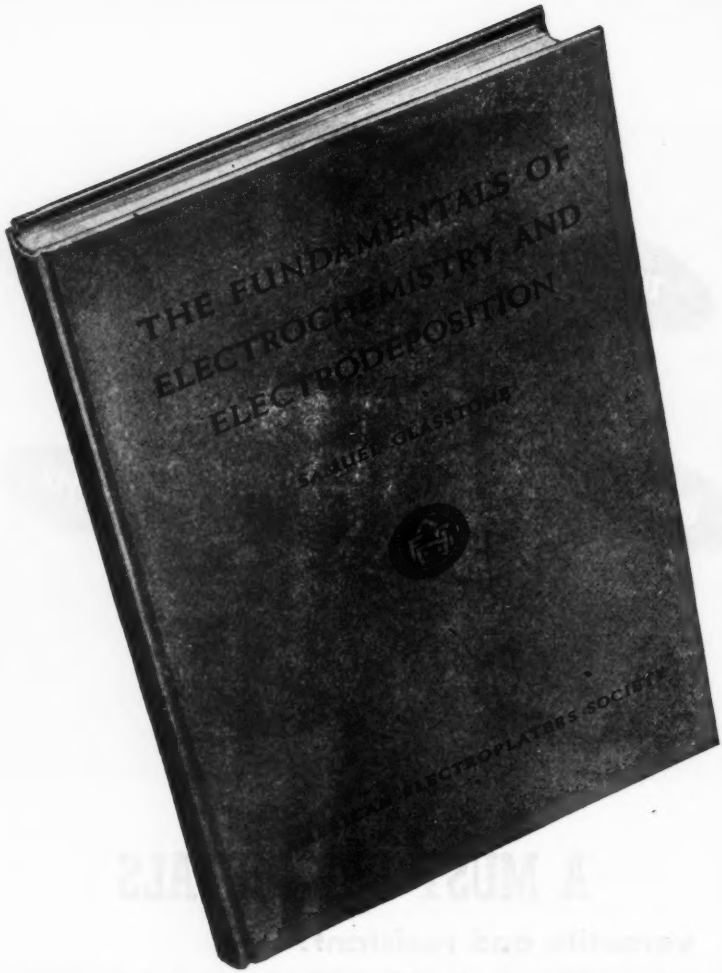

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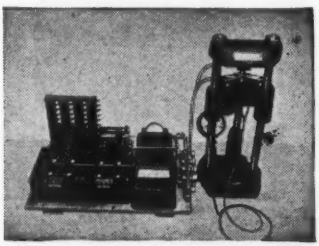

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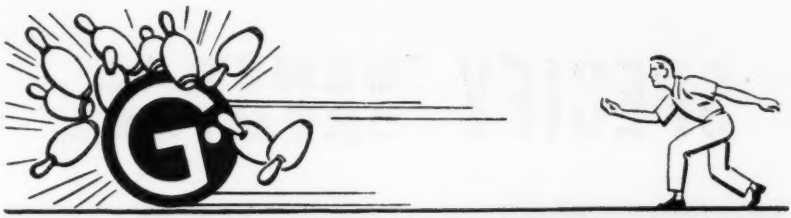

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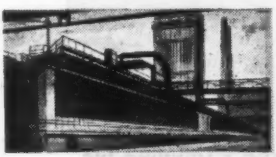

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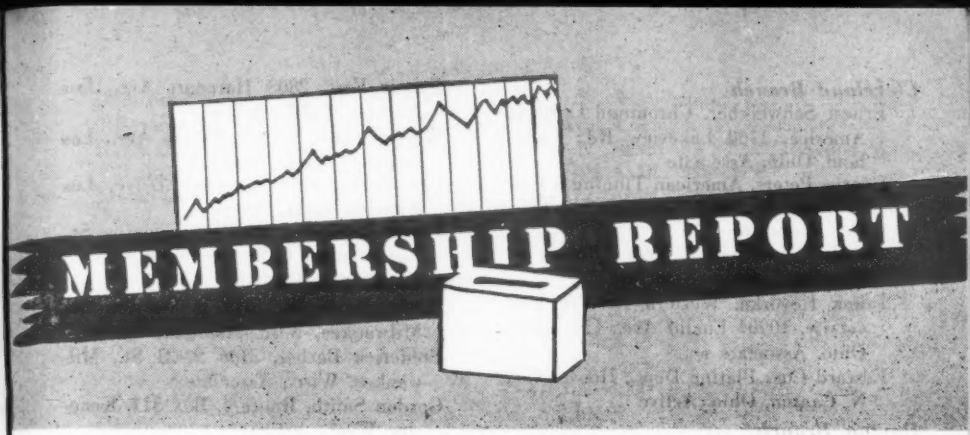

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George Lemak, 7921 Graff Ave., Pittsburgh, Pa., Active

Providence-Attleboro Branch

Michael Bessacini, 251 Potters Ave., Providence, R. I., Active

John Bonetti, Progress Jly. Mfg. Co., 17 Beverly St., Providence, R. I., Active
Harry Holt, 6 Garden St., Pawtucket, R. I., Active
Frank Downes, 42 Dayton Ave., Hoxie, R. I., Active

St. Louis Branch

William C. Milks, 6148 Crescent Ave., St. Louis, Mo.
P. E. Shanahan, Wyandotte Chemical Co., Paul Brown Bldg., St. Louis, Mo.
Frank Moore, 5220 Lotus Ave., St. Louis, Mo.
Cecil Thompson, 1226 Lulu Ave., Wichita, Kans.
William Hartman, 603 S. Pershing, Wichita, Kans.

San Francisco Branch

N. C. Phillips, 15 & Vermont St., San Francisco, Calif., Associate
Lynds Jones, 12 Concord St., San Francisco, Calif., Associate
Domini Janaerto, 1439 Union St., Oakland, Calif., Active
Manuel Souza, 1719 69th Ave., Oakland, Calif., Active
Richard Lord, General Electric Co., 235 Montgomery St., San Francisco, Calif., Associate

Springfield Branch

Laurence Fountain, 15 Courtland St., Springfield, Mass., Associate
P. P. Ezekeil, P. O. Box 51, Feeding Hills, Mass., Associate

Waterbury Branch

George Kahan, 621 Main St., Watertown, Conn., Associate

APPLICATIONS

Baltimore-Washington Branch

John Kreml, Rustless Iron & Steel Corp., Baltimore, Md., Associate
Charles Swegler, 420 E. 20 St., Baltimore, Md., Associate

Bridgeport Branch

Joseph Klienman, 1250 Stratford Ave., Bronx, N. Y., Active
Thomas Barnes III, P. O. Box 38, Easton, Conn., Associate

Chicago Branch

L. Nelson, 525 24 Ave., Rock Island, Ill., Active
C. A. Oswald, 100 S. Jefferson St., Chicago, Ill., Associate
N. W. Humbaugh, 435 N. Michigan Ave., Chicago, Ill., Associate
R. L. Shannon, 7710 Kilbourn Ave., Skokie, Ill., Associate
J. J. Gruzdis, 4237 S. Albany Ave., Chicago, Ill., Active
M. S. Anderson, R.R.2, Elkhart, Ind., Active
L. A. Basco, 3265 W. Ogden Ave., Chicago, Ill., Active
J. Kemp, 1435 N. Pulaski Rd., Chicago, Ill., Active
A. A. LaTour, 4372 W. Ogden Ave., Chicago, Ill., Active

Cleveland Branch

James DaVino, 11712 Angelus Ave., Cleveland, Ohio, Active
John Kilbane, C. & B. Sales Co., 4500 Euclid Ave., Cleveland, Ohio, Associate
Frank MacIntyre, Rm. 607, 1279 W. Third St., Cleveland, Ohio, Associate
Paul Rebel, 3746 Prospect Ave., Cleveland, Ohio, Associate

Milwaukee Branch

Harvey Schultz, 3440 N. Booth St., Milwaukee, Wisc., Associate
William DeCheck, 3431 Eighth Ave., Racine, Wisc., Active

Newark Branch

George Roberts, 32 Weaver Ave., Bloomfield, N. J., Active
John Currie, 1454 Leslie St., Hillside, N. J., Associate
Solomon Barr, 810 Broadway, Newark, N. J., Associate

New York Branch

Eugene DeMascio, Fairchild Aerial Camera Corp., Jamaica, N. Y., Active
Roger Conroy, New York Telephone Co., New York, N. Y., Active

Pittsburgh Branch

Milton Hammond, 317 Meadow Lane, Edgeworth, Sewickley, Pa., Associate
Harold Read, Mellon Institute, 4400 Fifth Ave., Pittsburgh, Pa., Associate
J. T. Wilks, 704 Hemlock St., Avalon, Pittsburgh, Pa., Associate

Providence-Attleboro Branch

Clifton Sauerlender, 25 Towne St., Attleboro, Mass., Active
Bert Brastow, 26 S. Washington St., N. Attleboro, Mass., Active
Michial Napolitano, Gorham Mfg. Co., Providence, R. I., Associate

NOTICE TO PRECEEDINGS AUTHORS

While the 1945 convention has been cancelled there will be a rump meeting held at Pittsburgh, June 18th to transact necessary Society business.

The PROCEEDINGS will be published without interruption. Therefore all authors are urged to submit their papers without delay to Mr. R. A. Dimon, 210 Semple Street, Pittsburgh, Pa.

REINSTATED

Chicago Branch

F. Johnson, 3022 N. Whipple St., Chicago, Ill., Active

W. T. Seiter, 1840 Douglas St., Rockford, Ill., Active

CHANGE OF STATUS

Neil Maffei from Associate membership to Active membership

TRANSFERS

Andrew Liger from Boston Branch to Detroit Branch

Sherman Schroder from San Francisco Branch to Los Angeles Branch

William Cullen from New Haven Branch to Hartford Branch

Howard Hines from Springfield Branch to Boston Branch

RESIGNATIONS

Lancaster Branch

C. M. Elslager

Providence-Attleboro Branch

William Jaegle

SUSPENSIONS

Australia Branch

Edward Hamilton

Buffalo Branch

A. Conte

Detroit Branch

B. L. Bailes
A. E. Bergwald
B. Crowe
E. Denby
P. O. Jackson
B. W. Pocock
A. A. Sequin
F. E. Smith
E. Tawyer
G. H. Templin
J. Tardosinsky
J. T. McCaig

Springfield Branch

James Calvert
William Curtis
Morris Balaban

Syracuse Branch

Albert Lloyd

DEATHS

Chicago Branch

Frank Hanlon
C. Burgess

MEMBERSHIP CHART

BRANCH	May 1944	Change in Membership	Percent Change
FIRST GROUP			
LOS ANGELES	123	+36½	+29.6
CLEVELAND	115	+32½	+28.2
BOSTON	130	+36	+27.6
NEW YORK	158	+41½	+26.2
DETROIT	336	+53½	+15.9
ST. LOUIS	111	+16	+14.4
PHILADELPHIA	138	+16	+11.5
HARTFORD	114	+12½	+10.9
WATERBURY	111	+11½	+10.3
CHICAGO	323	+28	+ 8.6
NEWARK	198	+14½	+ 7.3
SECOND GROUP			
BRIDGEPORT	102	+18½	+18.1
BALTIMORE-WASH.	107	+19	+17.7
NEW HAVEN	95	+15½	+16.3
MILWAUKEE	97	+15	+15.4
DAYTON	100	+11½	+11.5
BUFFALO	80	+ 9	+11.2
GRAND RAPIDS	109	+11½	+10.5
ROCHESTER	83	+ 7	+ 8.4
TORONTO	109	+ 9	+ 8.2
SPRINGFIELD	79	— 7½	— 9.4
THIRD GROUP			
PROV.-ATTLEBORO	66	+37½	+56.8
INDIANAPOLIS	74	+39	+52.
TOLEDO	42	+13	+30.9
SYRACUSE	51	+12½	+24.5
JACKSON-LANSING	51	11	+21.5
PITTSBURGH	68	+12½	+18.3
TWIN CITY	39	+ 7	+17.9
AUSTRALIA	51	+ 9	+17.6
SAN FRANCISCO	39	+ 5½	+15.
MONTREAL	50	+ 4	+ 8.
LANCASTER	40	+ 1	+ 2.5
ROCKFORD	23	—	—
CINCINNATI	63	— 5½	— 8.7

Membership May 1, 1944 = 3385
Membership May 1, 1945 = 3939

Gain in Membership = 554
Per Cent of Gain 16.3%

WALTER PINNER

Chairman, Program and Educational Committee

The Nature and Hardness of Electrolytic Deposits

By N. F. LASHKO and B. G. PETRENKO. *Trudy Inst. Khim. Khar'kov. Gosudarst. Univ.* **5**, 227-33 (1940); *Khim. Referat. Zhur.* **4**, No. 7-8, 3 (1941); *Chem. Abstracts* **38**, 684 (1944).

Copper deposited from a sulfate bath on an annealed copper cathode at 2.5 amp./sq. ft. had the same hardness as the basis metal. Deposition on a harder surface (obtained by polishing) resulted in a considerably harder deposit. Deposition on a surface which had been hardened and then annealed gave a soft deposit again. The increased hardness of the deposits is attributed to the distortion of the structure of the deposited metal, which "adapts" itself to the structure of the basis metal.

ERNEST H. LYONS, JR.

Electrotyping Without Wax, or Impression Lead

By R. M. SCHAFFERT and BRUCE W. GONSER. *Photo-Engravers' Bull.* **33**, No. 2, 35-7 (1943); *Chem. Abstracts* **38**, 685 (1944).

Plating of a plastic mold by copper, nickel, or iron is accomplished by making the surface conductive by applying a thin film of silver by a spray gun which mixes and sprays two solutions: a silver solution, and a reducing solution. Covering is nearly instantaneous.

ERNEST H. LYONS, JR.

Electrolytic Zinc Plating of Steel and Copper Wire in Cable Manufacture

Z. A. DEMCHENKO. *Vestnik Inzhenerov i Tekhnikov* **1941**, No. 1; 48-50; No. 1, 48-50; *Khim. Referat. Zhur* **4**, No. 9, 104 (1941); *Chem. Abstracts* **38**, 1432 (1944).

Tinning of wire to be made into cable can be replaced by zinc plating. Zinc coatings .0018" thick protect the wire during the vulcanization of the rubber cover by forming a ZnS film. Zinc dissolves so slowly under the vulcanized rubber that the corrosive effect of the Cu-Zn couple is very negligible. Acid zinc plating is superior to alkaline zinc plating.

ERNEST H. LYONS, JR.

The Effect of HF and H_2SiF_6 on the Electrolytic Deposition of Chromium from Solutions of Chromic Acid as Compared to H_2SO_4

By JOHANNES FISCHER. *Wiss. Veröffent Siemens-Werken* **1940**, 138-68; *Chem. Zentr.* **1941**, I, 2856; *Chem. Abstracts* **37**, 6557 (1943).

In chrome plating baths, HF gives higher cathode efficiency at lower c.d. than H_2SO_4, and the best efficiency is at higher CrO_3 concentrations. The efficiency depends on the bath temperature and concentration of HF, and decreases with increasing concentration of HF. Solutions containing HF are especially sensitive to "over acidification." Current efficiency generally decreases rapidly with increasing temperature, but baths containing HF or H_2SiF_6 are not very sen-

sitive to temperature changes. The deposit is bright from H_2SO_4, highly lustrous from H_2SiF_6, and somewhat dull from HF. The attack on the anode and the amount of trivalent chromium consumed are somewhat greater with H_2SiF_6 than with H_2SO_4. The hardness of the deposit is to a marked degree independent of the conditions of operation.

ERNEST H. LYONS, JR.

Routine Determination of Zinc

By LLOYD GEORGE MILLER, ALBERT J. BOYLE and ROBERT B. NEILL. *Ind. and Eng. Chem.* **16**, 256 (1944).

Instead of titrating zinc with standard potassium ferrocyanide, the zinc is precipitated by adding an excess of this reagent. The excess ferrocyanide is then determined by titration with standard ceric sulfate, using *o*-phenanthroline as an indicator. Interference from iron is minimized by oxidation with potassium ferrocyanide. The method was developed for determining zinc in magnesium alloys; manganese, cadmium, and tin do not interfere. (It may be of interest in the analysis of zinc plating baths. —E. H. L.).

ERNEST H. LYONS, JR.

Titrimetic Determination of Zinc

By PHILIP J. ELVING and JOHN C. LAMKIN, *Ind. and Eng. Chem.* **16**, 194 (1944).

For the rapid determination of zinc in alloys, precipitation of zinc oxalate in 70% acetic acid solution is recommended. The precipitate is dissolved in sulfuric acid and titrated with potassium permanganate. (No advantages appear for the analysis of zinc or alloy plating baths, but the procedure might occasionally be useful in the analysis of zinc alloy deposits.—E. H. L.).

ERNEST H. LYONS, JR.

Korolak for Protecting Electroplates

G. V. MIL'VITSKII. *Korroziya i Bor'ba s Nei* **6**, No. 5-6, 62-4 (1940); *Khim. Referat. Zhur.* **4**, No. 9, 145 (1941).

Korolak, a soln. of chlorovinyl resin in chlorbenzene containing tritolyl phosphate, sovol and similar compds. as plasticizers, is a good protective means for electroplates on brass. The adhesion of varnish can be increased by adding finely dispersed kaolin and by applying it to a polystyrene resin base. Under these conditions the varnish film also adheres to Fe. On prolonged action, 60% H_2So_4, concd. HCl and, especially, 60% HNO_3 destroy the protective film. 10% HCl and 10% NaOH have no effect on the film. **Testing the Stability of "Koralak" in Electroplating Baths.** A. I. GERSHEVICH. *Ibid.* "Korolak" had good protective properties for at least 10-12 months in Cr-plating baths, and at least 30 days in Ni-plating baths. It did not contaminate the Ni bath or injure the Ni plate.

W. R. HENN, *Chemical Abstracts*

The Determination of the Cyanide Content of Electrolytic Baths

E. RAUB and J. PETERS. *Mitt. Forsch. Inst. Edelmetalle Staatl. höheren Fachschule schwabisch Gemünd* **1941**, 1-20; *Chem. Zentr.* **1941, II**, 236.

Free cyanide in electrolytic Au and Ag baths can be titrated exactly by the Liebig method if KI is added as indicator. To prevent premature formation of ppt. which dissolves again but with difficulty, NH_3 soln. is added to the sample to be titrated. Titration with KBr as indicator is also exact if at first the NH_3 contained in the bath is removed. In Cu baths, free cyanide can also be titrated with KI as indicator if sufficient $KAg(CN)_2$ is added. Without addn. of $KAg(CN)_2$, free cyanide can be titrated by maintaining definite operating conditions, whereby larger amts. of KI are required. In Zn, brass and Cd baths, free cyanide cannot be titrated exactly. In Zn-Cd baths, the total content of cyanide can be detd. with KI after addn. of NaOH. In brass baths, only the free cyanide together with that bound to Zn can be titrated exactly. In this case after addn. of NaOH and $KAg(CN)_2$, titration is effected as in Ag baths.

M. HARTENHEIM, *Chemical Abstracts*

Electrolytic Polishing of Metals such as Zn or Cu or Their Alloys

ROBERT W. MANUEL (to Crane Co.). U. S. Pat. 2,330,170, Sept. 21.

A treatment is employed which involves subjecting the metal to electrolytic action as anode in a bath having a c.d. of not less than 200 amp. per sq. ft. of surface being polished, the bath used being formed of water 100, chromic acid about 12.5, $Na_2Cr_2O_7$ about 37.5 acetic acid about 12.5, and H_2SO_4 about 10 parts by wt.

Chemical Abstracts

DR. GEORGE DUBPERNELL

"Elektrolytlosungen"
(Electrolytic Solutions)

Gustav Kortum. 483 pages. Akademische Verlagsgesellschaft, Leipzig, 1941, Price 28 Marks. Republished March, 1945 by Edwards Bros., Ann Arbor, Michigan. Price $9.75.

This book is in direct contrast to that of Harned and Owen which was reviewed in the May, 1944 issue of the *Monthly Review*. While Harned and Owen emphasized the mathematical treatment of certain aspects of the subject only, Kortum has attempted a more complete review with emphasis continually on the experimental measurements and with the mathematical treatment of results minimized. This does not mean that Kortum has neglected mathematics. He has merely subordinated it to the description and correlation of the various measurements which have been made and published, and mathematical developments of purely mathematical interest are avoided. The result appears to be an interesting and readable review of the subject for those who can read German, and one which it would seem desirable and useful to have a translation of.

Some idea of the ground covered may be obtained from the eighteen chapter headings, which run as follows: The Evolution of the Theory of Electrolytes, The Thermodynamics of Dilute Solutions, Energy and Molecular Processes in the Dissolving of a Salt, Experimental Proof of the Invalidity of the Classical Theory of Dissociation, Experimental Methods for the Determination of the Degree of Dissociation and Activity Coefficient, The Debye-Huckel Theory, The Experimental Investigation of the Limiting Laws, The "Ion Diameter," Incomplete Dissociation of Strong Electrolytes, The Importance of van der Waals' Forces in Electrolytic Solutions, Concentrated Solutions, Diffusion Potentials and Ion Activities, Some Applications of the Interionic Attraction Theory to the Evaluation of Experimental Results, Acids and Bases, Dissociation Constants and Chemical Constitution, The Kinetics of Catalytic Neutral Salt Action, Salting Out and Salting In Effects, The Reciprocal Effect Between Ions and Solvent Molecules.

There is also a Subject Index, but no Author Index. An Author Index would have been helpful, as both American and other foreign literature is thoroughly reviewed in addition to the German publications, and numerous references to the literature are given throughout the book. This book is well bound and printed on fairly good paper, better than the paper used for many of these reproductions of German books.

While the present book is readable and carefully written, it does not seem to the reviewer to mark any long step forward, or serve to simplify what is at present a very complex subject. The results of tests and the theories developed in a number of different fields of research are reported and discussed, but there does not appear to be any close correlation between these. The book seems to lack a concluding chapter to review and correlate the results in the widely different fields. There is a ten-page introductory chapter, but this is principally a brief history of theories of dissociation. The theory of dissociation would seem to be the only common denominator for the data presented, but it still appears inadequate to explain the results in various fields. The present book is no doubt a worthwhile step in this direction, but there still seems to be a great need for someone to come forward with a better theory to simplify matters.

(1) **The Fundamentals of Electrochemistry and Electrodeposition, by Samuel Glasstone, 90 pages, $2.00.**

(2) **Electroplating and Anodizing, by J. Rosslyn, 224 pages, $2.50.**

(3) **Principles and Applications of Electrochemistry, Volume I Principles. H. Jerman Creighton, Fourth edition, 477 pages, $5.00.**

(4) **An Introduction to Electrochemistry, by Samuel Glasstone, 553 pages, $5.00.**

(5) **Modern Metallurgy for Engineers, by Frank T. Sisco, 432 pages, $4.50.**

(6) **Standard Handbook for Electrical Engineers, Edited by A. E. Knowlton and R. M. Shook. 2303 pages, $8.00.**

(7) **How to Understand Electricity, by A. Frederick Collins, Revised edition, 326 pages, $.69.**

(8) **Commercial Methods of Analysis, by Snell and Biffen, 753 pages, $6.00.**

(9) **Hardness and Hardness Measurements, by Samuel R. Williams, 558 pages, $7.50.**

(10) **Commercial Waxes—Natural and Synthetic, by H. Bennett, 583 pages, $11.00.**

(11) **32nd A.E.S. PROCEEDINGS, 6½ x 9¼ cloth, 279 pages, $5.00. Contains all technical papers and discussion presented at 32nd Annual Convention.**

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INDUSTRY NEWS

LANCASTER BRANCH

The Lancaster Branch of the A.E.S. met this evening at 8:00 o'clock P.M. at Mt. Wolf, Pa. The meeting was the occasion of "A Trip thru the American Wire Fabrics Co." at Mt. Wolf. The trip was sponsored by our President, Mr. R. Hoenstine, who is superintendent of that plant.

The trip was very interesting and the members saw screen cloth being made from start to finish. After the trip the members and visitors adjourned to the Conewago Inn where the business meeting was held and refreshments were served, through the courtesy of Mr. Hoenstine.

At the business meeting the secretary read the minutes of the last meeting and they were approved. The nominating committee announced the following nominees:

D. Fleming—President
H. Kilheffer—Vice President
W. H. Fordney—Secretary-Treasurer
C. Snyder—Librarian
R. L. Hoenstine, C. E. Brubaker, N. Gebert—Board of Managers.

The committee appointed to take care of the Annual Meeting in May announced that Boothman's Bowling Center had been reserved and that a movie "Target for Today" was secured.

The Research Committee reported that the Branch had contributed $50.00 to the Research Fund.

A Past Supreme President, Fred Fulforth was present and addressed the members for a few minutes. The meeting was adjourned at 11 o'clock.

WILLIAM H. FORDNEY, *Sec'y*

The above report was lost in the mails and reached us after the forms had closed for the regular section. Rather than hold the report over until June it is incorporated herewith.

Los Angeles Hails 15th Anniversary

By M. D. RYNKOFS, *General Chairman*

The Los Angeles branch members, its supporting supply companies and their friends attended the 1945 Educational Session and Banquet style Dinner at the Los Angeles Breakfast Club's Palatial Headquarters Saturday, March 24th.

M. D. RYNKOFS
General Committee
Chairman

F. C. RUSHTON
General Committee

The plating industry and their friends gathered to pay tribute to the branch's officials who were responsible for arranging the largest affair in the history of the branch.

Program for the day was divided into two parts. Mr. Earl Coffin, educational chairman assisted by Mr. Emmett Holman with his sound projector, opened the Educational Session with two sound color films, "Travelogue of Yuccatan" and "Electronics in Use Today" followed by a Sea Bass luncheon served in the Breakfast Club's headquarters.

During the luncheon course the writer called upon several members to expel their dinner jokes, so Jack Beall, of A. J. Lynch & Co., Harold Krosche of the L. A. Branch, Dick Crane of the Lea Mfg. Co., of Waterbury, Conn., and Fred P. Green of the Crown Rheostat Co., Chicago, Ill., supplied this after luncheon laughter.

Following the noon repast, inspection of the displays was made by some 112 visitors who were thrilled at the exhibits shown, developed during these war time conditions.

The second part of the program began at 1 p.m. Earl Coffin introducing Mr. P. L. Pine, of the Harshaw Chemical Co., Cleveland, Ohio, who presented his subject with slides "Importance of Purity in Plating."

In the absence of Bill Jackson of the Udylite Corp., Detroit, Mich., Mr. J. A. Raskin of the same company delivered his subject of "Problems of Zinc and Cadmium Plating."

Mr. Fred P. Green of the Crown Rheostat & Supply Co., demonstrated a Miniature Automatic Unit with his subject "Modern Plating Equipment."

Answers were given to questions asked after each speaker concluded his respective subject with more enthusiasm than in prewar times, this ardor of mind was contributed to war time production developments. It just goes to show what a great and democratic world we live in, when we can hold such a Session without the fear of a Buzz-Bomb or an eleven tonner dropping on us.

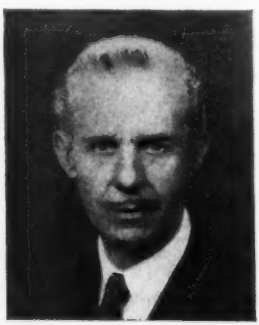
In the evening, places were completely reserved for 348 persons—these avid premiere devotees—jammed the lobby and refreshment quarters adjacent to the Banquet hall, to hail and wish well to each other over the successful completion of the Program Directory.

Policed with unusual care, celebrities arrived and were quickly steered to the attractive usherettes, Miss Loraine Bedwell, Mrs. Dean D. Williams, Mrs. Stanley Rynkofs and Mrs. Kathryn Klinefelter who seated them at their respectibe tables—only to be serenaded by our lovely Betty Gordon, her accordian and her smiling song numbers.

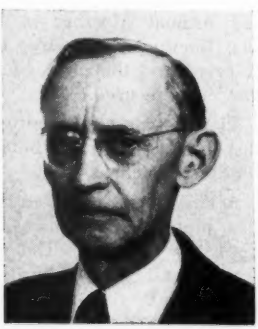
Following this serenading, a flood of waiters began serving a steaming sumptuous turkey dinner, a preparation only the Breakfast Club can serve. At the conclusion of the dinner, Art Whiting and his Orchestra from Hollywood presented the guests with Cinematic dance numbers long to be remembered. At nine o'clock, the National Anthem was played and the writer acting as M. C. officially opened the Banquet Program with the statement:

"In behalf of the Los Angeles Branch of the American Electroplaters' Society, its entire membership and the committee who has charge of preparing this affair, we bid you a most hearty welcome.

JOSEPH SUNDERHAUS
President



FRANK BUNKER
Branch Secretary-Treasurer



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General Committee

EARL COFFIN
Librarian and
Technical Committee

ERNEST LAMOUREUX
Editor

EMMETT R. HOLMAN
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D. D. WILLIAMS
Technical Committee

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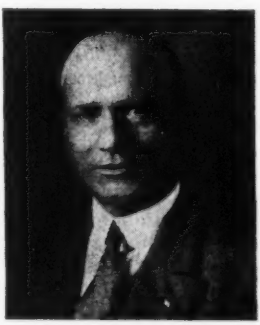
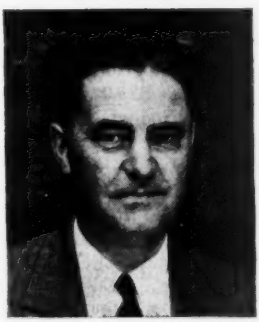


DON BEDWELL
Technical Committee

E. W. WELLS
First Vice-President



D. N. ELDRED
Second Vice-President and
Technical Chairman

"It is obvious that this group of members and friends, constitute the largest attendance in the history of the branch's activities.

"We are gathered here tonight to celebrate our 15th Anniversary in the Society. We also are here to celebrate the Publication of the 1945 Program Directory, one of the most outstanding, if not the outstanding achievement of any Branch in the Society.

"You gentlemen who have received your copy tonight, but who have not had time to read the book, will find that it contains such Technical Data and Information, that it may help in some small way to further the Advancement of the Science of Electroplating.

"We extend our thanks to the donors of War Bonds and other Door Prizes to be given away free at 10 o'clock.

"We also wish to express our thanks to the exhibitors of products on display, used in our industry.

"Next year we hope to display an array of finished products by our former exhibitors, who are at present engaged in plating and processing war implements. These finished products will show many innovations and qualtiy of workmanship, brought about by Government specifications and enforced by the War Production Board.

"The endeavors of the Banquet Committee have been to arrange everything for your pleasure and enjoyment and is here to serve you further to that end.

"Thank You."

At 10:30 Earl Coffin conducted the Door Prize drawing, Mrs. Irvin Frauenhoff, wife of the Branch's 1940-42 Sec.-Treas., volunteered to pull the lucky numbers:

Mr. Roswell C. Koch, of the Cannon Electric Co., won the first $25.00 War Bond, donated by the L. A. Branch.

Miss Charlotte Snyder's lucky number won her a $25.00 War Bond, donated by the Turco Products Inc., courtesy of E. R. Holman.

Mrs. Gladys Krekovian, employed by the Ace Painting Co., won the third War Bond, donated by the L. A. Branch.

Mrs. Alice Toledo, wife of Salvador Toledo, employed by the Pacific Enameling & Plating Co., won the 4th War Bond, donated also by the L. A. Branch.

A war time produced floor lamp was won by Tom McGuire of the Andrew Brown Lacquer, and ironically, $10.00 worth of War Stamps donated by Andrew Brown Lacquer Co. and courtesy of Tom McGuire, was won by Miss Loraine Bedwell.

1 qt. of Rare Stuff, 100 proof I. W. Harper, was won by Mrs. Clarence Stickley of the Turco Products Inc.

1 qt. of Bonded Canadian Club Brightener, was claimed by Mr. Clarence E. Thornton, Mgr. of the Chas. F. L'Hommedieu & Sons Co., Pacific Coast Branch.

Mr. Howard Woodward of the Sundmark Supply Co., won a 5 lb. Fruit Cake donated by M. D. Rynkofs.

A carton of cigarettes, donated by Mr. Carl Klinefelter was won by Mr. Wm. F. Arnett, associated with the Don M. Bedwell Plating Co.

A First Aid Kit was won by Mr. F. Cavallera, member of the San Francisco Branch and owner of the Progressive Plating Co., Oakland, Calif. This emergency unit was donated by the Industrial Tape Corp., courtesy Jack Hodge.

Mrs. Henry Podgorney of the Turco Products Inc., won a $5.00 War Stamp, donated by the L. A. Branch.

A $5.00 War Stamp was won by J. V. Murray, owner of the Hard Chrome Products Co., donated by Jack Hodge Rubber Supply Co.

And with the last dance number played at 11:45, Los Angeles Branch ended another brilliant chapter of its already glowing history.

Geissman Passes

Jack Geissman, an active member of the Milwaukee Branch recently passed away. His death will be mourned by his many friends.

Last December the Milwaukee Branch gave Mr. Geissman a testimonial dinner honoring his years of active membership and service to the progress of the Branch.

Pennsalt PM-40

An organic acid pickling inhibitor in powdered form, designated Pennsalt PM-40, has recently been developed by the Pennsylvania Salt Manufacturing Company. This material is highly stable and is completely soluble in pickling baths of either muriatic or sulfuric acid. It contains 100% active ingredients and is highly effective at such low concentrations as 0.02% to 0.10%, by weight of the pickling bath.

Concentrations may be varied to meet plant conditions, production rate, and quality of surface desired. This material effects economies in both acid and metal, while minimum quantities of inhibitor are required. Due to high base metal protection the acid is consumed principally in scale and rust removal with the result that the useful life of the bath is prolonged. Pennsalt PM-40 can be used in acid pickle baths prior to electroplating, galvanizing, and enameling since it is free-rinsing and minimizes hydrogen absorption. Packaged in drums of 25, 100, and 200 pounds, it is available in commercial quantities for bulk pickling operations through the Special Chemicals Division of the Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pennsylvania.

AMENDMENT PROPOSED BY BALTIMORE-WASHINGTON

The Baltimore-Washington Branch submits the following change in the By-Laws, Supreme Society:

(New text is placed within parenthesis)

Part 1. Supreme Society

ARTICLE VI

Section 6, now reads as follows: Research Committee: (a) The President shall appoint the Chairman of the Research Committee, who shall select from eight (8) to twenty (20) persons who are either active or associate members of the Branch Societies. This committee is authorized to solicit funds for research from persons, firms or organizations. (b) Such funds shall be held in custody by the Executive Secretary of the Society and disbursed with the approval of the Chairman and the Sub-Committee on Disbursements (etc).

Change Section 6 to read as follows: :

Research Committee: (a) (The Research Committee shall consist of nine persons who are active or associate members of Branch Societies, the Executive Secretary and one representative from each Technical Organization that may be designated by the Executive Board. The nine members from the Society shall be appointed by the Executive Board. Of the original appointees from the Society, three will serve for a three-year period, three for two years and three for one year. Three new members will thereafter be appointed each year for a term of three years, but no member shall be appointed to the Committee shall elect one of its members appointed from the Society as Chairman, who shall serve for a term of one year. No person shall serve as Chairman of the Committee for more than two consecutive terms). This committee is authorized to solicit funds for research from persons, firms or organizations. (b) Such funds shall be held in custody by the Executive Secretary of the Society and disbursed with the approval of the Chairman (and the Executive Secretary), etc.

C. G. Ozar

Ozar to Cowles Detergent

The Cowles Detergent Company announces the appointment of Clarence G. Ozar to the staff of their Metal Cleaner Service Laboratory. Mr. Ozar received his degree in chemistry from the University in Detroit and comes to Cowles after twelve years experience in the metal working industries.

Mr. Ozar's technical background and practical experience make him an extremely valuable addition to the Company's rapidly expanding metal cleaner department. He will assist directly in solving metal cleaning problems both in the laboratory and in the field.

Peninsular Chemical Products Co. Organized

Announcement has been made of the organization of the Peninsular Chemical Products Company which will manufacture complete lines of protective coating materials for the plating industry and for other industrial uses.

President of the new company is M. C. Brennan who is also President of General Industrial Products Company, New York; International Railway Car and Manufacturing Company, Kenton, Ohio; and B and D Gauge and Tool Company, Detroit.

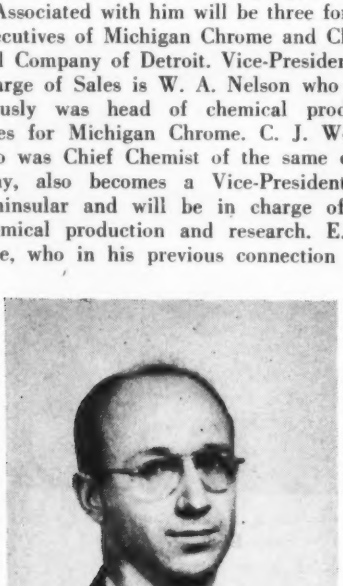
Associated with him will be three former executives of Michigan Chrome and Chemical Company of Detroit. Vice-President in charge of Sales is W. A. Nelson who previously was head of chemical products sales for Michigan Chrome. C. J. Weine, who was Chief Chemist of the same company, also becomes a Vice-President of Peninsular and will be in charge of all chemical production and research. E. H. Ploe, who in his previous connection was responsible for purchasing, priorities and personnel, is Secretary and Treasurer.

The Company has purchased a plant at 6795 East Nine Mile Road, Van Dyke, Michigan, and are starting immediate production of rack coating lacquers, masking lacquers and tape, stop-off wax, maintenance paint and specialized protective coatings for industrial purposes. A layout dye, used as a background for preparing scribed layouts on metal, will also be manufactured.

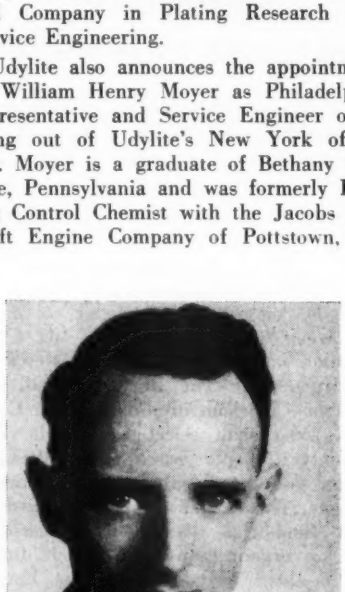
Udylite Appointments

The Udylite Corporation, 1651 E. Grand Boulevard, Detroit, announces the appointment of Arthur A. Schuenemann as Metal Finishing Service Engineer. Mr. Schuenemann is a graduate of Ohio State University. He was formerly employed by the General Electric Company and for the past ten years has been with the Harshaw Chemical Company in Plating Research and Service Engineering.

Udylite also announces the appointment of William Henry Moyer as Philadelphia representative and Service Engineer operating out of Udylite's New York office. Mr. Moyer is a graduate of Bethany College, Pennsylvania and was formerly Plating Control Chemist with the Jacobs Aircraft Engine Company of Pottstown, Pa.



W. H. Moyer



A. A. Schuenemann

Optimus Announces Line of Detergents

The Optimus Detergent Company, 130 Church Street, Matawan, N. J., has just announced a new line of industrial metal cleaning materials, designed to cover a wide range of specific applications. Emphasis is placed on the use of the proper detergent in conjunction with the correct cleaning method. The new products are announced as available in Alkaline, Acidic, Solvent and Emulsion types. A new folder describing the products entitled "Announcing Dependable Optimus Detergents" has just been issued.

Welch Elected V. P.

L. Earle Welch has been elected Vice-President of the Industrial Hard Chromium Corp. of 7 Rome Street, Newark, New Jersey, and will head a newly established division of engineering research and development in the application of hard chromium plating to molds and tools used in the plastics industry, it was announced here yesterday by W. A. Crowder, President of the Company.

Mr. Welch, now with the Bakelite Corp., is a graduate of Massachusetts Institute of Technology, and was formerly with General Electric Co. at Lynn, Mass., in engineering research. He is well known in the plastics and machine tool industry for his recent research and engineering work in the development of the tools and equipment which made possible the production of the plastic frangible bullet slug now used in Air Corps gunnery practice. The establishment of the new division under his leadership at the Chromium Company, effective May 1st, is in recognition of the rapidly expanding use of hard chromium plating in industry.

Rheem Research Products Announces New Division

Rheem Research Products, Inc., Baltimore, has formed a new Marketing Division to promote and broaden the use of Iridite, and to develop new product ideas.

Under the direction of Harry C. Irvin, the Marketing Division will work directly with basic industry on corrosion problems. Chief product of the company is Iridite — a corrosion-resistant finish for zinc and cadmium plated surfaces, zinc die castings and hot-dip galvanized products.

Jules Horelick has succeeded Mr. Irvin as Superintendent of the Baltimore plant.

Rheem Research Appoints New Eastern Field Engineer

Effective March 26th, Howard M. Marie will represent Rheem Research Products, Inc., Baltimore, manufacturers and marketers of Iridite, in the Southern New Jersey, Pennsylvania, Maryland and West Virginia Territory. Mr. Marie has, for the past twenty years, been closely associated with the metal finishing and electroplating industry.

New Polishing Wheel Bulletin

Illustrates, describes and outlines uses of all kinds of polishing wheels such as the many types of muslin, canvas, sheepskin, bull neck and felt wheels — also special purpose wheels.

Bulletin 101 is available on request to The Manderscheid Company, 605 West Washington Street, Chicago 6, Ill.

Manufacturers Representative

An established manufacturers representative located in Tel-Aviv, Palestine is interested in making contact with American manufacturers of plating supplies and equipment.

Firms interested in a contact of this nature are urged to write the *Monthly Review* for details.

United Chromium Open Dayton Office

To streamline present activities and to prepare for post-war operations, United Chromium, Incorporated announces the opening of a new District Office in Dayton, Ohio, and the appointment of two men, well known in the midwest territory where they have been active for many years, as District Managers.

L. A. Critchfield

R. H. Dudley

L. A. Critchfield is now managing the District Office at 845 North Main St., Dayton, O., and will supervise activities in Southern Ohio and Indiana, West Virginia, Kentucky, Tennessee, Alabama and Mississippi. "Roy" joined United Chromium in 1940, with an excellent background of technical training and more than 15 years research and production experience in metal finishing. Although operating out of Detroit since that time, he is equally well known in Eastern Electroplating circles. Formerly in charge of the plating and polishing division of Hamilton Watch Company, he served as Vice President of the Philadelphia Branch and later founded the Lancaster Branch of the American Electroplaters Society.

R. H. Dudley has been made Detroit District Manager in charge of Michigan, Northern Ohio and Indiana, and Western Pennsylvania. He is a graduate industrial chemical engineer and has been with United Chromium since 1929 specializing in sales and service engineering. Having a broad practical experience in the installation and operation of metal finishing processes, Bob Dudley enjoys a wide acquaintance among manufacturers and job platers in the East as well as in the Mid-west. The Detroit Sales Office together with a research laboratory and pilot plant is located at 2751 East Jefferson Ave.

Chemist

Situation open—East Coast manufacturer of corrosion-resistant finishes needs a chemist with good technical background to carry on development work of new products. Ability to write technical reports essential. State age, experience, draft status, and availability in your first letter. All replies confidential. Box No. M. R. 5.

A.S.T.M. Meeting Cancelled

Cancellation of Regular Annual Meeting and Exhibit: The A.S.T.M. Executive Committee at its meeting on April 10 decided to cancel the five-day regular Annual Meeting of the Society (scheduled for Buffalo, June 18-22 incl.) and instead to plan for a business session or sessions to be held probably the last week in June in New York City. This will permit actions on the formal standards to be consummated and Society business to be conducted. Also cancelled is the Exhibit of Testing Appara-

tus and Related Equipment which had been scheduled for the Annual Meeting.

The Society will proceed with the printing of its technical papers and reports that would normally have been presented and these will be distributed to the members as is customary. The Society's technical committees are holding meetings at various times and places and its work on specifications and tests for materials continues intensively.

Extension of Activities: Based on the report of a committee of authorities which had investigated exhaustively the various angles involved, the Society is extending its standardization activities in the field of ultimate consumer goods and is appointing a new administrative committee to direct this. The March ASTM *Bulletin*, copy of which you will receive, has an article covering this matter and there is enclosed to a number of journals which it is known are definitely concerned with this work a duplicated copy of the article. If any of you not getting the statement wish to see it before the *Bulletin* goes in the mails (in about a week or ten days) advise and we will mail a copy promptly.

Another phase of work will be undertaken, namely, "the study, development and standardization of methods of tests of materials, parts, and assemblies, in actual or simulated service conditions." A detailed report on this work appears in the March *Bulletin*. There have been numerous recommendations that the Society undertake work in this field which is of growing importance and it is felt A.S.T.M. can render considerable service here as it has done in the strictly materials fields for so many years.

AMENDMENT TO THE CONSTITUTION PROPOSED BY NEWARK BRANCH

Supreme Society

Part 1 — Article 2

Membership

Sect. 1. Class: The membership of the Supreme Society shall consist of three (3) classes — Active, Honorary and Sustaining.

Sec. 2: As is.

Sec. 3: As is.

Sec. 4: Sustaining Members: Any firm or person directly interested in the electplating industry and the aims and welfare of this Society, may upon the contribution of not less than $ per year, become a sustaining member. The acceptance of such contribution by a majority vote of the Executive Board shall constitute membership. Sustaining membership shall terminate when contributions have ceased for one fiscal year. All funds received from Sustaining Members shall only be used for investigation of problems and processes directly related to research in the art and science of electroplating or any of its allied arts. The names of Sustaining Members shall be published each year in the Proceedings. Sustaining Members shall be entitled to receive copies of the MONTHLY REVIEW, Annual Proceedings and any literature pertaining to the advancement of the art of electroplating or allied arts, issued by the Supreme Society.

Note: We recommend that a one hundred dollar ($100.00) annual contribution be the minimum amount to qualify for Sustaining Membership.

Branch Societies

Part 2 — Article 2

Sec. 1. Classes: The membership shall consist of two (2) classes — Active, Honorary.

Sec. 2. Active Members: These shall consist of any person who is directly connected with the electroplating industry and who will pledge to support the aims and welfare of this Society. He may also be required to pass such examination in the deposition of metals as may be deemed advisable by the Branch. Applications for membership shall be approved by a majority vote of the Branch Board of Managers before being submitted to the Branch for voting. Applications must receive a majority vote at a Branch meeting to be elected to membership.

Sec. 3. Honorary Members: Honorary Membership may be conferred by a majority vote of the Branch upon those whose knowledge and services have added to the welfare of both the Branch and the Supreme Society.

Sec. 4: Omit.

Sec. 5 to be 4, 6-5, 7-6, 8-7, 9-8, 10-9, 11-10, 12-11.

Part 1 — Article IV

The following qualifications shall determine eligibility to election as a Supreme Officer:

1) Active Member in good standing.
2) Foreman, Supervisor, Chemist, Metallurgist, or Executive actively engaged in electroplating.

Should the status of a Supreme Officer change during his term of office, he shall complete his term of office.

Binai and Chesterfield Form Precision Electroplating Co.

The following announcement was received from W. R. Binai:

"I have resigned my position as Consulting Engineer from the RCA and I am returning to Indianapolis. Mr. A. L. Chesterfield, President of the Aluminum Finishing Company, and myself incorporated a new company which will be known as the Precision Electroplating Company, located in Indianapolis. We anticipate doing large scale job shop production of hook as well as barrel work, commercial plating as well as precious metals such as gold, rhodium and heavy deposits of silver."

O'Keefe Passes

The sudden death of one of our most beloved members, Mr. Thomas O'Keefe, on Friday, March 30th, gave his many friends a terrible shock. Tom O'Keefe was one of the few "war horses" of Toronto Branch. He was always ready and willing to accept a duty and did his best to promote harmony and good-will at all times. He was particularly valuable as a committee member. Regardless of the difficulties encountered, Tom always worked for the interest of Toronto Branch. He was a leader in all social and sporting events held by the Branch. His tragic death has cast a gloom over the lives of scores of his admiring friends.

Mr. Thomas O'Keefe was born in Wallingford, Conn. Aug. 7th, 1882. As a youth he was employed by Simpson Hall & Millin, in Wallingford, under the supervision of Mr. Thos. Brosnan, a veteran plater who is now an honorary member of an Eastern Branch of the A.E.S. Subsequently, Mr. O'Keefe worked for R. Wallace & Sons, Wallingford. The Middletown Silver Plate, Middletown, Conn. Adelphi Silver Co., Brooklyn, N. Y. Parksburg Stamp & Mfg. Co., Parksburg, Pa. In 1915 Mr. O'Keefe came to Toronto to take charge of the plating department of the Standard Silver Co., a branch of the International Silver Co., and remained in that position until the plant was closed in 1931. Immediately after that he assumed charge of the plating department of Lipman Bros., manufacturers of silver finished products, and was a valued member of their staff at the time of his untimely death. He leaves a widow (formerly Ethel Stroup of Parksburg, Pa.) and two daughters, Mrs. T. Quigg and Miss Mary Elizabeth at home. A brother Fred, in Meriden, Conn. and a brother Cornelius, in Bridgeport, Conn. Also a sister, Mrs. D. Pizzoli, of Meriden, Conn.

Toronto Branch extends to Mrs. O'Keefe and all the bereaved relatives sincere sympathy in this sad hour.

Nelson Todd Leaves H-VW-M

The Hanson-Van Winkle-Munning Co., Matawan, N. J. announces with regret the retirement of their Secretary and Director, Nelson Todd who leaves to go into other fields. Mr. Todd, who has served with the company for 29 years, has contributed greatly to its welfare. His associates have publicly expressed their appreciation of his work with them, and their best wishes for his future success.

N. A. Munning, formerly Asst. Treasurer, has been elected Secretary of the company.

High Levels of Quality Needed

TANKS which are built for operation under severe corrosion conditions require attention to details that represent the difference between what is best and what "will do." Attention to selection of materials, attention to details of design and welding technique which prevent the formation of corrosion pockets, attention to drainage and exhaust systems for the protection of adjacent equipment.

For twenty years, Storts has been planning and producing custom built tank installations for the plating industry. In the long run, Stortswelded tanks are economical—they protect your profits by stopping corrosion losses, and by outlasting your expectations of service and durability.

STORTS WELDING COMPANY

42 Stone Street Meriden, Conn.

Manufacturers of Welded Fabrications to Specification

ST. LOUIS BRANCH

St. Louis Branch held its regular meeting on April 18, 1945 at York Hotel. Dinner was served to 50 members.

Minutes of previous meeting were read and approved.

Mr. O. Dingledein, Chairman of Research for St. Louis Branch, made report that all was going along fine and appeal would be in the mail before long.

Election of Officers was held:

John Moran, President; Fred Stark, Vice President; C. T. McGinley, Secretary-Treasurer; G. K. Robins, Librarian; O. Dingledein, A. Barth and C. Hamm, Board of Managers.

C. T. McGINLAY, *Sec'y*

PHILADELPHIA BRANCH

President Zurbach called the Philadelphia Branch A.E.S. meeting to order and turned the gavel over to Librarian Hirsch.

Mr. Hirsch introduced Fred Fulforth, of United Chromium, Inc., member of Philadelphia Branch, and Past Supreme President of the A.E.S., as the speaker of the evening whose subject was "Porous Chromium Plating Principles, Procedures, and Operating Practices."

The speaker gave his illustrated lecture in a manner quite different from other lecturers.

As porous chrome plating is somewhat different from routine plating, the speaker held the attention of the members from the start to the finish.

Throughout the lecture, Mr. Fulforth answered some rather interesting questions for the members.

A rising vote of thanks was given Fred for an interesting talk.

The applications of Frank R. Skutta and Irvin K. Hauseman, associates, were referred to the Board of Managers.

Communications from W. L. Pinner, 1st Supreme Vice President, E. T. Candee, Executive Secretary, and R. A. Dimon, Pittsburgh Branch Educational Chairman, were read and noted.

Henry Orlik, Chairman, Philadelphia Branch Research Committee, reported the contributions from this vicinity.

Dr. Graham reported for the Supreme Research Committee.

There was quite a discussion on ways and means of getting the manufacturers and job shop owners to contribute to the Research Committee.

Chairman Verrell, of the Entertainment Committee, arranged for an April dinner meeting.

Nominations:

President—E. J. Zurbach, Jr.
1st Vice President—Henry Orlik
2nd Vice President—E. F. Ottens
Secretary—Paul Mentzer, Sr.
Treasurer—Geo. M. Long
Librarian—Albert Hirsch
Board of Managers—George Gehling, Jos. E. Underwood, Nathaniel Verrell.

The bills were ordered paid.

PAUL MENTZER, SR., *Sec'y*

MILWAUKEE BRANCH

The April meeting was held at the Wisconsin Hotel. The yearly election of officers resulted in the election of:

Mr. Wm. Geissman, President, by an unanimous ballot.

Mr. Robert Goodsell, First Vice President.

Mr. Al. Hermansen, Second Vice President.

Mr. T. Hartshorn, Librarian.

Mr. James Durnford, Secretary-Treasurer.

Mr. James Paulson, as three year member of Board of Managers.

After the election the meeting was

turned over to Mr. Geissman, who introduced Mr. Vince Mattacotti, who spoke on rapid silver plating. Mr. Mattacotti who is now with the Milwaukee Plating Co., was formerly with Conn. Ltd. His talk was very interesting covering many details on the effects of brightener and bath composition with respect to rapid deposition. Proof of the popularity of Mr. Mattacotti was the large turn-out. The hall wasn't large enough to seat everyone comfortably.

JAMES DURNFORD, *Sec'y*

WATERBURY BRANCH

Mr. W. S. Morrison of the Illinois Water Treatment Co. delivered a very interesting talk before the Waterbury Branch at the regular monthly meeting held April 13th at the Hotel Elton. The subject "Purification of Water for the Plating Room" was of great interest and importance to our group. Water in rinsing, water in cleaning and the water in the plating bath itself has many times been the cause of difficulties which were hard to explain. This new method, where first the cations and then the anions are removed by ion exchange giving large volumes of water almost as pure as if distilled, is of immense help in difficult problems.

The disposal of plating room wastes is another problem whose solution is assisted by the use of ion exchange. The State of Connecticut is now very conscious of the polution of our streams and rivers and a real effort is being made to clean them up, an effort which will be accelerated after the war. Factories will be required to deliver waste water free from harmful impurities. Where water is expensive or the quantity limited waste water can be purified and recovered for further use at relatively small expense.

George Dubpunell reviewed Kolthoff's book "Polarography." This book describes a potentiometric method for qualitative and quantitative analysis in which both potential and flow of current are measured at a dropping mercury cathode. In plating it provides a valuable means of determining metallic impurities in solutions.

Bill Starr discussing priorities pointed out that we cannot expect too much relief from restrictions after VE-Day. While prime contracts are expected to be reduced 15-20%, making some difference with the ease in which materials can be procured, nevertheless, restrictions on chemicals are bound to continue for some time.

Henry Strow covering new developments called our attention to the possibilities in the use of the vapor blast for removing surface scale, etc., from metal and also suggested that some important uses might be developed for supersonic sound in plating processes.

S. L. HENN, *Sec'y*

TWIN CITY BRANCH

Following our dinner the meeting was called to order at 8:00 P.M. by President E. H. Lindemann. The Secretary gave the minutes of the last meeting and the report on the branch's treasury. They wre both unanimously approved by the members. Mr. A. T. Leonard, member of the Party Committee, gave a report on the proposed branch stag-party to be held June 9th. From the members present, it is evident that the party is being looked forward to.

Mr. Paul W. Felt, chairman of the Membership Committee, introduced our new members: Mr. Carl J. Sundquist of Ohio Chemical Co., and Mr. Mark Murphy of St. Paul Electroplating Works. These men were welcomed into the branch.

Following the introduction of new members, Mr. Felt then proceeded to draw a name out of the box. The member whose name was drawn out was Mr. F. W. Nelson of Perfection Mfg. Co., who was able to name the other members on each side of him and in front of him, so Mr. Nelson was awarded our monthly free dinner.

Following a short intermission, President Lindemann turned the meeting over to A. T. Leonard who, in the absence of Ralph A. Bowman, our librarian, introduced our speaker. He was Mr. Raymond F. Ledford, Plating Engineer for Hanson-Van Winkle-Munning Co. Mr. Ledford spoke on "Bright Zinc Plating." Following his talk, Mr. Ledford answered several questions presented. Here are a representative of the questions asked:

Question: What is a good procedure to make lacquer and paint stick to zinc plated articles?

Answer: There are several good primers on the market or one of the chromate films such as Cronak, Iridite or Anozinc. Either of these processes are successful.

Question: What are the results or benefits obtained from using Potassium salts in zinc solutions in barrel plating?

Answer: One thing is that potassium salts are more easily obtained today than sodium. However, the deposits are whiter, but the deposit is not as bright with potassium salts. There is an increase in the cathode efficiency and you are able to plate faster with such a solution. Potassium solutions are found to be most satisfactory in silver and copper solutions, but there needs to be more work done on the use of potassium salts in a zinc solution.

Question: What effect do varying plating conditions and various brighteners have to do with the formation of a chromate film on zinc plated articles?

Answer: Most brighteners are plated out with the metal and this occlusion often times offers difficulty in the formation of a chromate film. If the zinc is oxidized, the chromate film will not form effectively.

R. L. BUCKLEY, *Sec'y-Treas.*

DETROIT BRANCH

Detroit Branch held their regular monthly meeting at Hotel Statler on April 6th, 1945. The Nominating Committee submitted the following list of candidates for the various offices for the year 1945-1946.

President—R. B. Saltonstall
1st Vice President—Wright W. Wilson
2nd Vice President—Paul W. C. Strausser
Secretary-Treasurer—F. L. Clifton
Librarian—Kenneth Wall
Board of Managers—Jess E. Bunch, Herbeth E. Head, George L. Nankervis.

The members agreed to unanimously elect this slate. Eleven new members were elected and several applications for membership were submitted. A motion was entertained to increase the members' dues to $10.00 per year, $1.00 of which would be given to the Research Fund. It was pointed out that the dues of most other technical societies are higher than ours, and that the increased costs of operation could not be met without the application fees from a larger increase in membership than can be expected. The motion was carried unanimously.

Mr. Jess E. Bunch, Cadillac Motor Company, presented a masterful talk on the use of the plating rack as a "Tool." There was an attendance of close to 200 who enjoyed a picture titled "Combat America." This is a sixty-three minute film shown in color through the fighting forts and bomb bays of B-17 planes during raids over Germany edited and narrated by Major Clark Gable.

F. L. CLIFTON, *Sec'y-Treas.*

NEW HAVEN BRANCH

The first meeting of the New Year for the New Haven Branch, was held on January 9, 1945 in Parlor "B", in the Hotel Taft. This meeting was in the form of a social and business meeting.

President Lynch called the meeting at 8 p.m. and heard the various reports of the committees. Jack English reported the illness of Roy Brown and requested flowers be sent. The members present joined in wishing Roy a speedy recovery.

At the end of the business session, there were movies of the "1944 Convention" by the courtesy of the Lea Mfg. Co., also a film entitled "The Shape of Things to Come" by the courtesy of Boonton Molding Co., Boonton, New Jersey. The latter film aroused much interest and answered many questions of the future possibilities of Plastics.

After the showing of these films refreshments were served and the members enjoyed the singing of the "Walco Sextet" of the R. Wallace & Sons. Charley Koelbl as pianist with Jack Gormley and "Detroit Rex" Ed Leonard did some competitive bass singing accompanied by the entire gathering.

Meeting adjourned at 11:30 P.M.

B. J. GAFFNEY, *Sec'y*

NEW HAVEN BRANCH

The New Haven Branch of the American Electroplaters' Society held their regular monthly meeting on Tuesday evening, February 6, 1945 in the Sterling Chemistry Laboratory of Yale University.

President Walter T. Lynch called the meeting to order at 8 p.m. Foreseeing a lengthy educational session, President Lynch turned the meeting over to the Technical Chairman, Mr. Joseph T. Sullivan. Mr. Sullivan introduced Mr. R. O. Hull of the R. O. Hull Company of Cleveland, Ohio. Mr. Hull honored the New Haven

Branch by bringing with him "The Hull's Cell." This important new tool provides the plater in getting a quick determination of the condition of his plating solution. Using slides and various plating solutions, presented by the members, Mr. Hull gave the branch a fine platers' evening and received a hearty vote of thanks for his courtesy in bringing his Cell to our meeting.

Meeting adjourned at 11 p.m.

B. J. GAFFNEY, *Sec'y*

NEW HAVEN BRANCH

The New Haven Branch meeting of the A.E.S., was held on March 6, 1945 in the Hotel Taft.

The meeting opened at 8 p.m. with the showing of a Technicolor film "Combat America" which featured Major Clark Gable as editor and narrator. This picture showed the training of a bomber crew and their actual combat mission over Germany.

President Walter Lynch announced there would be a short business meeting and told the members the Regional Convention, to be held in Waterbury this year, has been cancelled. Mr. Joseph T. Sullivan was appointed to head a committee to plan a branch party to be held in June.

Mr. Joseph Sexton, our Educational Chairman for the evening, was unable to attend and Dr. H. L. Kellner introduced Mr. C. A. Marlies, Director of Research, Meloplast Co., who spoke on "Plating of Plastics." The speaker gave a very interesting talk on the various composition of plastics with special emphasis on methods found industrially suitable for electroplating.

Displaying many samples of his work and generously answering the many questions asked of him, Mr. Marlies gave the members an insight into the future of Plastic Plating.

Meeting adjourned at 11 p.m.

B. J. GAFFNEY, *Sec'y*

ST. LOUIS BRANCH

Regular meeting of the St. Louis Branch was held March 21 at 6:30 P.M. Dinner was served to 40 members.

After roll call, minutes were read and approved.

Three applications were read. Motion made and seconded that they be elected to membership. One transfer, making total of 4.

Nothing further, meeting was turned over to G. K. Robins, who introduced the speaker of the evening, Mr. Faust of Battelle Inc. who spoke on electrolytic polishing and pickeling. After his talk many questions were asked. Mr. Faust knew all the answers. He was given a rising vote of thanks.

Chairman of Banquet made a few remarks stating a good time was waiting them at the banquet that would be held in May. Nothing further, meeting adjourned.

C. T. MCGINLEY, *Sec'y*

SYRACUSE BRANCH

The Syracuse Branch held its regular March meeting on Friday, March 23, in Bowne Hall, Syracuse University at 8:00 P.M. Twenty-two members were present.

The minutes of the previous meeting were read and accepted.

Letters from Messers. Candee, Pinner, Dimon and McKeon regarding various aspects of the postponed 1945 convention were read and discussed. The business of appointing a delegate to the proposed business meeting was tabled until the April meeting. A letter from Mr. Alfred L. Ferguson concerning the Research Project, "Methods of Measuring Adhesion of Electrodeposited Coatings" was read and the accompanying mimeographed sheet distributed.

Dr. N. F. Murphy, president of the Syracuse Branch, was then introduced as the speaker for the evening. Dr. Murphy gave a very interesting talk on "Corrosion." The electrochemistry of corrosion was reviewed and a number of slides were shown illustrating the effect of various factors on corrosion rates. Following the talk, there was a lively discussion which displayed the universal interest in the subject of the evening. During the discussion Dr. Murphy asked Mr. D. M. Overcash to discuss "Salt Spray Testing." Mr. Overcash discussed briefly some of the recent changes, developments, and investigations pertaining to Salt Spray Testing.

The meeting was adjourned at 10:30 P.M.

NEIL MAFFEI, *Sec'y-Treas.*

NEWARK BRANCH

The regular meeting of the Newark Branch, A.E.S., was held on Friday evening, March 16, 1945 at the Hotel Robert Treat in Newark, N. J. The meeting was called to order at 8:30 P.M. with President Robert R. Sizelove presiding. All other officers were present.

The minutes of the previous meeting were read and approved.

Communications from S. Sgt. Mike Trifoglio; Ingersoll Rand Co.; Commercial Controls Corp.; E. T. Candee, Executive Sec'y; and Walter L. Pinner, First Vice President were read and placed on file.

Applications for George Robert to Active Membership; John M. Currie and Solomon E. Barr to Associate Membership were voted to take the regular course.

Mr. Horace Smith and the Secretary reported on what took place in Pittsburgh on March 3rd.

The Secretary was instructed to send a letter of sympathy to Mrs. VanZandt.

Ed Washburn, our Librarian, conducted a very interesting and unique question box. He asked members to come to the front and tell of what they knew about certain types of tests. It was surprising to find out how many different types of tests are being conducted by individual members which are not published anywhere. Many of these tests will be published in the next Newark Branch Year Book.

Meeting adjourned at 11:00 P.M.

GEORGE WAGNER, *Sec'y*

PITTSBURGH BRANCH

The regular meeting of the Pittsburgh Branch was held Thursday, March 15th, at the Roosevelt Hotel. Twenty-five members were present for the dinner at 6:45 and thirty-five were present for the meeting at 8:00 P.M.

President Johnston read a letter from O.D.T. denying the A.E.S. permission to hold their National Convention in Pittsburgh this June. He reported that the National Officers met in Pittsburgh, March 4th and decided the Society should hold a one day meeting in Pittsburgh, June 18th. At this meeting each Branch is to send one delegate for the transaction of business. The educational papers will be published as usual except there will be no discussion until the convention in 1946. The last date for papers to be received by the Educational Committee is June 1st.

In a discussion of the National Research Committee's program President Johnston asked the local Board of Managers to draw up a recommendation of the method in which Pittsburgh Branch should financially support the National Research Committee.

Mr. Wilfred S. McKeon is in the West Moreland Hospital in Greensburg as a result of an auto accident.

Our Librarian, R. A. Dimon, introduced Dr. C. L. Faust of Battelle Memorial Institute who gave a very interesting talk with slides on Electro-polishing.

The meeting was adjourned at 10:15 P.M.

FRANK R. KELLER, *Sec'y*

PITTSBURGH BRANCH

The regular meeting of the Pittsburgh Branch was held Thursday, April 12, at the Roosevelt Hotel.

This was a social meeting with the ladies invited. A cocktail party at 6:00 P.M. was furnished by the Pittsburgh Branch Suppliers Club. A chicken dinner was served at 7:00 P.M.

Having been disappointed by the planned entertainment, Chairmen Joe Wray and Bill Hennessy saw that everyone enjoyed themselves by dancing. Wilfred S. McKeon sent greetings since he is convalescing from an auto accident. President and Mrs. Sam Johnston just returned from Florida in time for the meeting.

Members of the suppliers club who helped make the meeting so successful are:

Bill Hennessy—Pennsylvania Salt Co.

Richard O. Hummel—Harshaw Chemical Co.

Paul B. McClosky—du Pont Co.

Wilfred S. McKeon—Sulphur Products Co.

Ben F. Parlett—Hanson-Van Winkle-Munning Co.

Jack Pearsall—Udylite Corp.

Wm. A. Rodgers—Rodgers-Kolene Co.

Joe L. Wray—Egyptian Lacquer Co.

Mr. Snyder—Lea Mfg. Co.

The next meeting will be held Thursday, May 17, at which time there will be election of officers.

FRANK R. KELLER, *Sec'y*

SPRINGFIELD BRANCH

The February meeting of the Springfield Branch, American Electroplaters Society was held at the Hotel Charles, Springfield, Mass. on February 26, 1945. The meeting was called to order by President Hastie at 8:15 P.M.

The minutes of the January meeting were read and approved. Laurence R. Fountain was elected an associate member. The application of P. P. Ezekiel for associate membership was accepted.

Several communications were read from the National Society relative to the Pittsburgh Conference and others in regard to the Research Committee.

It was voted to send a letter of appreciation by the local branch to Mr. Edward Moll, Vice President of the American Bosch Corp. for the contribution of that company to the Research fund.

The Secretary then introduced the speaker, Harold Narcus, Chief Chemist, Plating Processes Corp., Holyoke, Mass. Mr. Narcus gave a very comprehensive and interesting paper on "The Deposition of Metals from Fluoborate Baths."

The paper was concerned chiefly with the Tin, Tin-Lead and Lead baths. The advantages and disadvantages of the various baths were discussed. Mention was also made of the other metal baths including Cadmium, Chromium, Zinc and Silver.

In the question period which followed Mr. Narcus was assisted by representatives of the General Chemical Co., Messrs. Crocker, Hoddeson and Lincoln.

The meeting adjourned at 10:00 P.M.

PAUL F. LYMAN, *Sec'y-Treas.*

MONTREAL BRANCH

Meeting of the Montreal Branch A.E.S. at the Mount Royal Hotel was called to order by the chairman Mr. J. Reisenburg at 8:30 P.M. Owing to the secretary being late the speaker was asked to address the meeting and the business of the meeting was considered after.

The speaker for the evening was Mr. Hopkins, The Sturgis Products Co., and his subject was Roto-deburring, honing and burnishing. A very interesting talk and many questions were the results of an educational evening. Mr. J. H. Feeley moved a vote of thanks to the speaker for his very interesting lecture.

The minutes of the meeting of March were read and moved by Mr. J. Feeley that they be adopted as read, seconded by Mr. F. Dupont.

A letter of thanks from Mr. C. Brisebois for the flowers sent by the Montreal Branch in sympathy with him in his recent bereavement was read and filed.

Letter from Mr. F. C. Mesle, Sup't., Bearing Div. Oneida Ltd. re his visit to Monreal. An invitation was sent to Mr. Mesle inviting him to attend our April 2 meeting.

Secretary was instructed to mail notices one week in advance of the meeting in order to give the members time to consider their candidates.

Mr. C. Douglas moved the meeting be adjourned 11:00 P.M.

W. G. FINLAY, *Sec'y-Treas.*

LOS ANGELES BRANCH

Meeting was opened by President Sunderhaus. There were 33 members and 5 guests present. The guests were introduced by Vice President Wells as follows:

Flying Officer Jack Harris, a member of the Melbourne, Australia branch and Warren Sales and Lee Davis of Advance Plating, Joseph Ahumado of Cooper Screw Mfg. and John M. James of Turco Products.

The meeting was turned over to Librarian Coffin who gave a very interesting talk on silver plating of pewter, brass and steel and the polishing of same. The questions asked were as follows:

1. Makeup of silver strike? ¼ oz. 1 gal. silver 6 oz. 1 gal. free cyanide used at 6 volts.

2. Makeup of plating bath? 3.5 ozs. 1 gal. free cyanide used at ½ to 1 volt.

3. Potassium cyanide better than sodium cyanide? Yes, it is more efficient and brighter.

4. How much silver needed to buff? One hour or .001 with agitation. 2 hours needed without agitation at a lower voltage.

5. How much anode surface? 1-1 if cyanide isn't too high and anodes are rivetted to a stainless steel hook below surface of solution.

6. Can drill rod be plated to .003 with good adherence? No, if it is ground. Hard nickel is the best—plated from nickel chloride solution then heated to 1500° F. in hydrogen furnace with slow cooling to 200° F. to stop distortion of rod.

7. Steel or stainless steel used as anode in strike.

8. What can be used to strip and clean pewter? Reverse cyanide for one hour will remove silver and leave clean surface.

9. Can silver be saved? Yes, if stripped in H_2SO_4 and HNO_3 and HCL added to an old strip will precipitate the silver.

Librarian Coffin asked F. O. Harris to say a few words and a communication was read from the President of the Melbourne branch asking that members be transferred from Los Angeles to Melbourne. A motion was made that Secretary Bunker be so instructed. Minutes of last meeting were read and also the financial report. Applications read by J. P. Wills for J. Ahumado of Cooper Screw and Lee Davis and Warren Sales of Advance Plating.

Initiation was held for John Homer, Service Plating Works, Jack Hodge, Hodge Supply Co. and Charles Stoughton, U. S. Marine Corps, San Diego.

Reports on Kaiser trip (Schoonover), Research Problems (Lamoureux), Banquet (C. Rynkofs), Membership (Wells.) Motion made for open meeting at Breakfast Club.

FRANK J. BUNKER, *Sec'y*

LOS ANGELES BRANCH

A regular meeting was held April 9th, 1945 at the Rosslyn Hotel. 36 members present. Visitors present were Ernest Fest of Tool & Jig Plating Co. and Bill Schuler of Kinney Co. In the absence of librarian Earl Coffin, Emmet Holman conducted a short educational session. Mr. Lamoureux reported on the research projects now being conducted by the Society, and made a motion that the Los Angeles Branch contribute $200.00 to the National Committee, and it was so voted.

Mr. Eldred made a motion to appoint a committee to investigate and present to the Branch information on the ratio of advertising to technical matter in Recent Reviews, and to what use money derived from advertising will be put. This motion carried.

The president appointed Mr. Eldred chairman, and he chose to serve with him Mr. Extale and Mr. Lamoureux.

Minutes and financial statement read and accepted. Bills ordered paid. Mr. Rynkofs, Chairman of the Banquet Committee, reported on the recent annual educational session and banquet, and his report was accepted with a vote of thanks, and his committee was discharged. Mr. Lamoureux gave a partial report for the Program Directory, with final report to be given May 14th. Mr. Schoonover reported on the Kaiser trip which the Branch decided to hold on April 27th.

The Branch held its annual election of officers with the following results:

Edgar W. Wells, President
D. N. Eldred, First Vice President
Howard Woodward, Second Vice President
Frank Bunker, Secretary-Treasurer
John F. Beall, Librarian.

Joseph Sunderhaus, Earl Coffin and Ernest Lamoureux were elected as a Board of Managers.

Bert E. Tuthill was reported ill and the Secretary was instructed to write him expressing the hope of the Branch for his early recovery.

There being no further business, the meeting adjourned.

FRANK J. BUNKER, *Sec'y*

CHICAGO BRANCH

The Chicago Branch held its regular meeting at the Midland Hotel on Friday, March 9th.

The Speaker of the evening was Mr. W. A. Helbig of Darco Corporation who spoke on the use of activated carbon in the plating room. The talk was illustrated by a glass covered filter, whereby the action of filter aid and carbon could be seen on the filter bags.

The Question Box contained the following questions:

1. What solution can be used to remove oxide film and also bright dip die cast aluminum castings without NO_2 fumes.

A. Dip in solution, 3 N. Sulphuric acid with 40 g./l. chromic acid at 160° F.

2. How does the electrical conductivity of cast iron compare with that of brass and copper? Would cast iron make a good hook for heavy work if not too much current had to be used?

A. Cast iron has about seven times the resistance of copper. Cast iron should be plated with copper and nickel to prevent corrosion and insure good contact.

M. H. LONGFIELD, *Sec'y*

INDIANAPOLIS BRANCH

The Indianapolis Branch of the American Electroplaters Society held its regular meeting March 7, 1945 at the Hotel Riley. President A. L. Chesterfield called the meeting to order promptly at 8:00 P.M.

The Secretary's and Treasurer's reports were read and approved. The Secretary also read letters notifying the Indianapolis Branch that the O.D.T. had rejected the applications for holding the national convention and joint meeting of the Cincinnati, Dayton, and Indianapolis Branches.

Mr. B. F. Lewis of the Northwest Chemical Company, Detroit, Michigan spoke to us on the subject "Adhesion of Electrodeposits." He gave us a brief outline of various methods of checking bond, pointed out that all good bond tests are destructive tests and that research work on methods of checking the adhesion of electrodeposits is well justified. He also discussed the most suitable methods for bonding electrodeposits to steel, copper, die castings, etc. and pointed out the effects of oil, dirt, and amorphous metal films on the resultant bond. Mr. Lewis concluded his talk by showing us a number of slides of photomicrographs of electrodeposits bonded to steels of various degrees of surface finish and also a number of electroplated heat treated die castings.

CARL MORRIS, *Sec'y*

INDIANAPOLIS BRANCH

The Indianapolis Branch of the American Electroplaters Society held its regular meeting April 4, 1945 at the Hotel Riley. A dinner was served at 6:30 P.M. and the business meeting was called to order at 8:00 P.M. by our President, A. L. Chesterfield.

The Secretary's and Treasurer's report were read and approved.

A short discussion was held on plans for a dinner dance to be given by the Branch in the latter part of May or early part of June. Mr. Chesterfield said he would appoint a committee to work out the details of the dinner dance and that they would make a report to the members at the next meeting.

Mr. A. J. Wurster and Sherwood (Pete) Rickert of the Industrial Filter and Pump Company, spoke to the members of the Indianopolis Branch. Mr. Wurster told us some of the most common troubles encountered with pumps and explained how they can be eliminated. Mr. Rickert made a demonstration showing how the bags of an Industrial Filter Pump became pre-coated with a filter aid and he also showed how the bags were cleaned by the use of compressed air without tearing down the filter unit.

The meeting was adjourned at 9:40 P.M.

CARL MORRIS, *Sec'y*

LOS ANGELES BRANCH

The February meeting of the Los Angeles Branch of the American Electroplaters Society was held February 12, 1945, with 37 members present.

Visitors were Marshall Wells of Westinghouse Electric, Mr. L. C. Richard of Maas & Waldstein, Jack Hodge of the Hodge Supply Co. and L. R. Eastman of Frederick B. Stevens Co. Mr. Wells gave a most interesting talk on development in light, with numerous demonstrations of its use in modern industry and warfare.

The minutes were read and accepted and the financial report was read and accepted. Communications were read and placed on file.

Marcus Rynhof reported as Chairman of the Banquet Committee, and the program directory was reviewed from the start and brought up-to-date.

It was suggested that we try to arrange a trip through the Kaiser Steel Plant at Fontana for one of our future meetings, and the Secretary was instructed to get in touch with Kaiser.

There being no further business, the meeting adjourned.

FRANK J. BUNKER, *Sec'y*

BRIDGEPORT BRANCH

The regular monthly meeting of the Bridgeport Branch of the American Electroplaters' Society was held Friday, March 2, 1945 at the Hotel Barnum. Due to the absence of President A. R. McNeil, who was away on business, Vice President Herman C. Braun opened the meeting at 8:30 P.M. with 36 members and guests present. We also had with us Mr. Howard J. McAleer, as a guest from Detroit, Mich. and President of the Formax Mfg. Co.

The roll call of officers was read and the Board of Managers, R. J. O'Connor and B. F. Kusterer were reported absent. The minutes of the previous meeting were read and accepted.

Reports of Special Committees

C. C. Helmle, Chairman of the Branch Research Committee, read a set of resolutions which the committee recommended for adoption. Vice President H. C. Braun asked for comments on these resolutions and after a discussion the Branch voted to accept the resolutions as read with a change made in paragraph six adding, that is $1.00 per quarter. The secretary was ordered to send a letter to the Executive Secretary expressing the general opinions and suggestions of the Branch.

President A. R. McNeil, member of the Regional Meeting Committee, received a letter from the Waterbury Branch stating that the Regional Technical Session and Banquet scheduled for April 28, 1945 with the Waterbury Branch as host has been cancelled. The letter was placed on file.

Reports of Standing Committees

The Sick Committee reported no sickness at this time.

Hubert M. Goldman, chairman of the Membership Committee, reported three applications for membership.

The Publicity Committee reports progress is being maintained.

The Projector Committee has no report to make at this time.

F. B. Gotthardt, Librarian and chairman of the Technical Sessions Committee announced a question box session with three experts in charge at the April 6th meeting. Fred also announced that Myron B. Diggin, Chief Chemist of the Hanson-Van Winkle Co. would talk on "Bright Alloy Plating" on Friday, March 23, 1945 at 8:00 P.M. at the Hotel Barnum.

A motion was made and passed to hold a banquet if it is possible at this time and Vice President Braun has appointed the following to serve on this committee: Wm. Ehrencrona, chairman, Ray Kwasnik, Fred Gotthardt.

A report of this committee will be given at our next business meeting.

Meeting adjourned at 11:00 P.M.

An Open Meeting and Educational Session was held Friday, March 23, 1945 at 8:00 P.M. at the Hotel Barnum. President A. R. McNeil opened the meeting and after a brief talk called upon Librarian F. B. Gotthardt to preside as Technical Chairman with 48 members and guests present.

After a few remarks concerning the meeting, Fred called upon Mr. Myron B. Diggin, chief chemist of the Hanson-Van Winkle-Munning Co., who talked on "Bright Alloy Plating." This solution is composed of copper cyanide, zinc cyanide, sodium stannate, sodium hydroxide, sodium cyanide and an organic addition agent. Metal concentration is less than one ounce per gallon using soluble alloy anodes from 3½ to 4 volts. The bath is operated at 150 degrees using current density at approximately 15 amperes to a square foot. The speaker illustrated the effect of these various variables together with the recommended composition on limits very well with slides. Several samples of this plated work were passed around to the members showing a very nice blue deposit. After a period of questions and answers, the speaker was given a rising vote of thanks for his very interesting paper. Next an interesting picture entitled "Tygan" was shown and the meeting was adjourned at 11:00 P.M.

JOSEPH G. STERLING, *Sec'y-Treas.*

BALTIMORE-WASHINGTON BRANCH

The Baltimore-Washington Branch held its regular meeting at Reichhart's restaurant in Baltimore on March 4, 1945.

Sixty-eight members and guests attended the meeting, sixty being present at the dinner.

Following the dinner, President Huston opened the business session by explaining that the incumbent secretary, Raymond Stricklen Jr., had entered the naval service, and that his work would be taken over by A. G. Taylor until the May elections.

The minutes of the March meeting were read and approved.

Guests, who outnumbered regular members present, were introduced.

A report was made on the status of the amendment to the constitution by-laws, section 6, Art. IV, which is being sponsored by the Baltimore-Washington Branch.

The branch research committee reported that the national committee felt they could not aid the local committees by: supplying

copies of the letters sent out by them, a list of the firms contacted in the branch areas, or reprints of the national research committee's reports published in the "Review." Due to this report is was recommended that six representative committees be contacted to determine what steps are being taken by other branches. Future action would depend on the findings.

The budget committee was asked to have a 1945-1946 budget report ready for the May business session, and the incumbent officers and committees were reminded that a report would be forthcoming covering the present business year.

A motion was made and passed authorizing the acting treasurer to transfer the branch banking assets from the Union Trust Company of Maryland to the 25th Street branch of the First National Bank—both banks in Baltimore.

Harry Irvin as the only member present from the banquet committee, consisting of Davey, Irvin, and Stricklen, received commendation on the excellent job done in arranging a very successful annual banquet.

In the absence of Maurice Caplan, a substitute report was given by A. G. Taylor on the investigation covering affiliation with the Engineers' Club of Baltimore.

At the end of the business session the meeting was turned over to Librarian Walter Olson, who introduced the speaker of the evening, Myron Diggin of the Hanson Van Winkle-Munning Co. As usual, Mr. Diggin gave a very interesting talk. His subject was "Alloy Plating."

Many questions were answered on the subject, after which Mr. Diggin was given a rising vote of thanks.

The meeting was then adjourned.

ALBERT G. TAYLOR,
Acting Sec'y-Treas.

BOSTON BRANCH

Boston branch met Thursday, April 5th at the Statler hotel, Boston with President Swift in the chair.

Minutes of the previous meeting read and approved.

Communications read the letter in regards to the meeting to be held June 18th at Pittsburgh, this was put over to the next meeting. Bills read and ordered paid.

The pin committee showed a design of the pin to be given past Presidents of Boston branch. The branch approved the pin and moved that the design be sent to the Executive-Secretary Candee to try and interest the other branches to buy them so that the pin can be bought much cheaper giving all the branches a chance to honor the Past Presidents.

Charles F. Campbell was made an Honorary Member of Boston branch.

The librarian Lennie Chesworth introduced Mr. Arthur Zavarella, Materials Engineer at the Springfield Armory. The title of his talk was "Recent Developments in Protective Finishes for Small Arms." His talk covered phosphate finishes and coatings over them, supplementary treatments for cadmium plate, and salt spray testing technique. This was a very interesting talk. He answered all questions for the members and was given a rising vote of thanks.

The meeting adjourned at 10:30 P.M.

A. W. GARRETT, *Sec'y-Treas.*

TOLEDO BRANCH

A regular meeting of the Toledo Branch of the A.E.S. was held on Thursday, March 1st, 1945 in the office of the Victor Miner Co., Toledo, Ohio.

The meeting opened at 8:30 P.M. with 15 members present, Mr. Weiker presiding in the absence of the President. Minutes of the previous meeting were approved as read.

Research committee reported on contributions made by Toledo firms. A question of burnishing plastics was referred to Mr. Beaver. A question as how to get red and black metalic color on brass, was answered by Mr. Pierce, zinc plate the brass, Iridite treatment then dye. It was suggested that the questioner write to George Hogaboom, and the United Chrome for further information on the matter.

Mr. Pierce of the Rheem Research Products, Inc. gave a very good talk on Iridite treatment. Mr. Pierce very capably answered all questions on the subject put to him by interested members.

A motion by Mr. Gerity to give Mr. Pierce a vote of thanks was seconded by Mr. Stegeman, and passed by unanimous vote.

The meeting adjourned at 10:15 P.M.

G. BERGEMAN, *Sec'y.*

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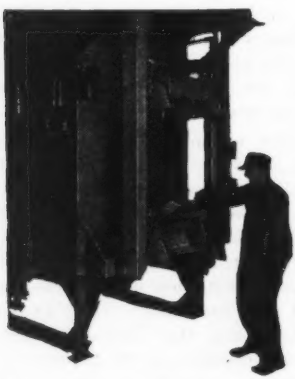

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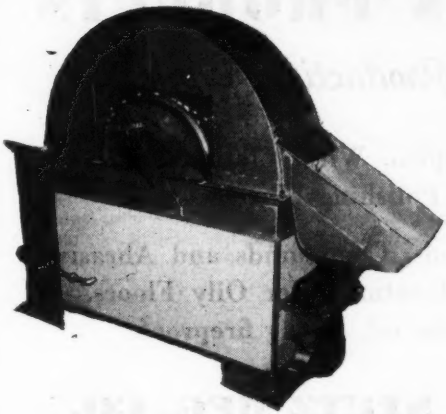

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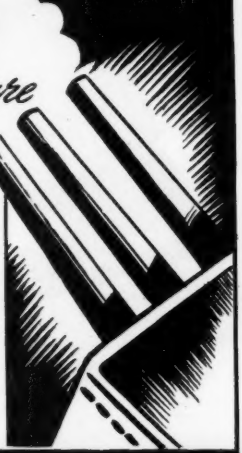

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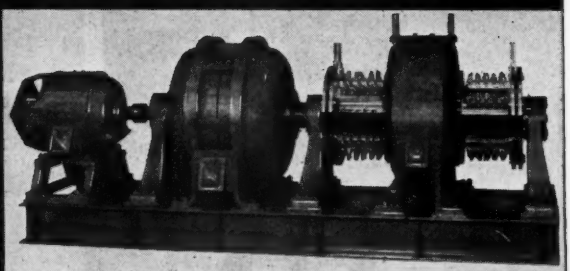

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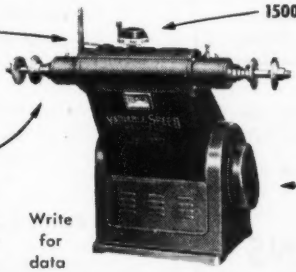

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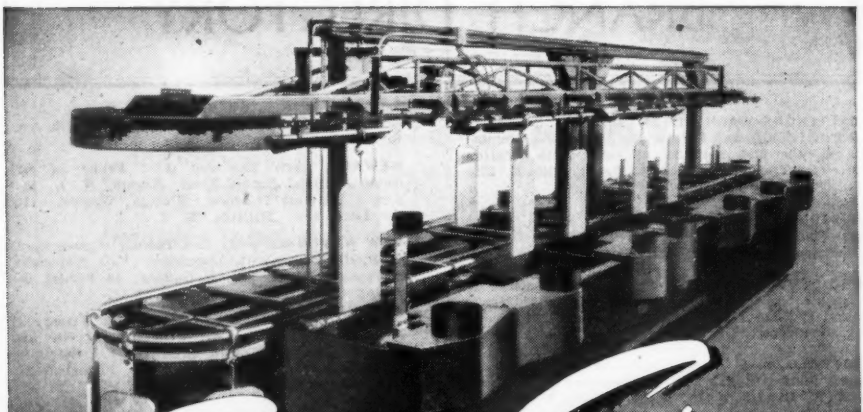

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INDEX TO ADVERTISERS

Abbott Ball Company 530
Alsop Engineering Co. 463
American Brass Company 440
American Chemical Paint Co. 488
Apothecaries Hall Co. 531

Baker Company, M. E. 528
Biofen Laboratories 534
Blakeslee & Co., G. S. 528
Burns Mfg. Corp., E. Reed 534

Ceilcote Company 536
Chemical Corp., The 431
Codman Company, F. L. & J. C. 462
Columbia Electric Mfg. Co. 531
Cowles Detergent Co. 490

Darco Corporation 447
Detrex Corporation 460
Diversey Corp. 479
Divine Brothers Co. 535
Du Pont de Nemours & Co., Inc. 481
Duralac Chemical Corp. 491

Egyptian Lacquer Mfg. Co. 446
Enthone Company, The 430

Fidelity Chemical Co. 442
Formax Mfg. Co. 470

General Chemical Co. 496
General Electric Mfg. Co. 493
Green Electric Co., Inc., W. 495
Gumm Chemical Co., Fred'k. Second cover

Hammond Machinery Builders 533
Hanson-Van Winkle-Munning Co. Back cover
Harrison & Co. 532
Hay Company, Jacob 536

Industrial Filter & Pump Co. 458

Kirk & Blum Mfg. Co. 535
Kocour Company 532

Lasalco, Inc. 464-465
Lea Manufacturing Co. 484-485
L'Hommedieu & Sons Co. 459

Maas & Waldstein Co. 461
MacDermid Chemical Co., W. D. 487
MacDermid, Inc. ..... 530, Third cover
Magnus Chemical Co. 441
Magnuson Products Corp. 535
Mandershied Company 486
McAleer Mfg. Co. 466
McGean Chemical Co. 529
Meaker Company 457
Mechanical Process Co. 529
Merck & Company, Inc. 533
Michigan Bleach & Chemical Co. 476
Michigan Buff Co., Inc. 536
Michigan Chrome & Chemical Co. 478
Mutual Chemical Co. of America 482

Nankervis Co., George L. 439
Northwest Chemical Co. 437

Oakite Products, Inc. 429
Optimus Detergents Co. 494

Pennsylvania Salt Mfg. Co. 450
Puritan Mfg. Co. 480

Quinn Company, Nelson J. 435

Rheem Research Products, Inc. 443
Roberts Rouge Co. 535

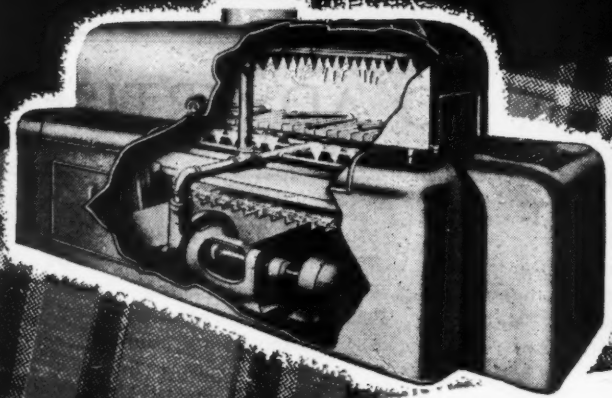
Sarco Company, Inc. 438
Seeley Company, E. E. 536
Seymour Mfg. Co. 448
Sparkler Mfg. Co. 477
Stevens, Frederic B. 432
Storts Welding Co. 517
Stutz Mfg. Co. 477
Sulphur Products Co., Inc. 489

Turco Products, Inc. 445

Udylite Corporation, The 538
United Chromium, Inc. ..... 434 & 449
U. S. Stoneware 483

Westvaco Chlorine Products Corp. 506
Wyandotte Chemical Corp. 436

Zapon Div., Atlas Powder Co. 444
Zialite Corporation 534



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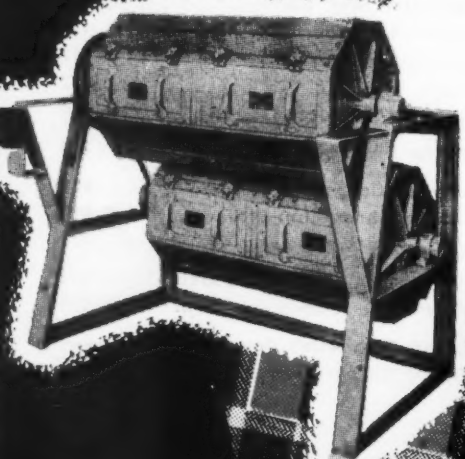

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